Trees.

The Spirit of Arbor Day— "GREEN-up AMERICA"

Western Shade Tree Conference . . . Sacramento, May 25-28

Control of Carriers of Some Elm Wilts — ***R. R. Whitten***

Greenwich Report on DDT for Scolytus — ***Dietrich and Balin***

March - April, 1949 *The Journal of American Arboriculture* Vol. 9—No. 3

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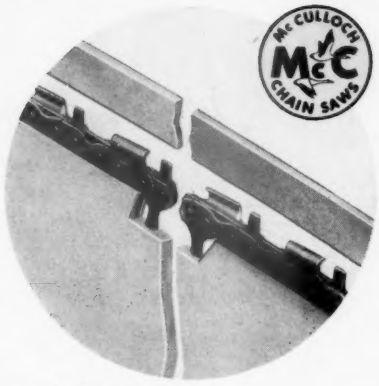

they start fast

The sketch shows how the McCulloch magneto differs from the conventional type. At any given cranking speed, magnetic lines of force are broken faster, giving a hotter spark at low speeds. The hotter spark means faster starting, in theory and in fact. Ask any operator of a McCulloch saw about time saved by instant starting.

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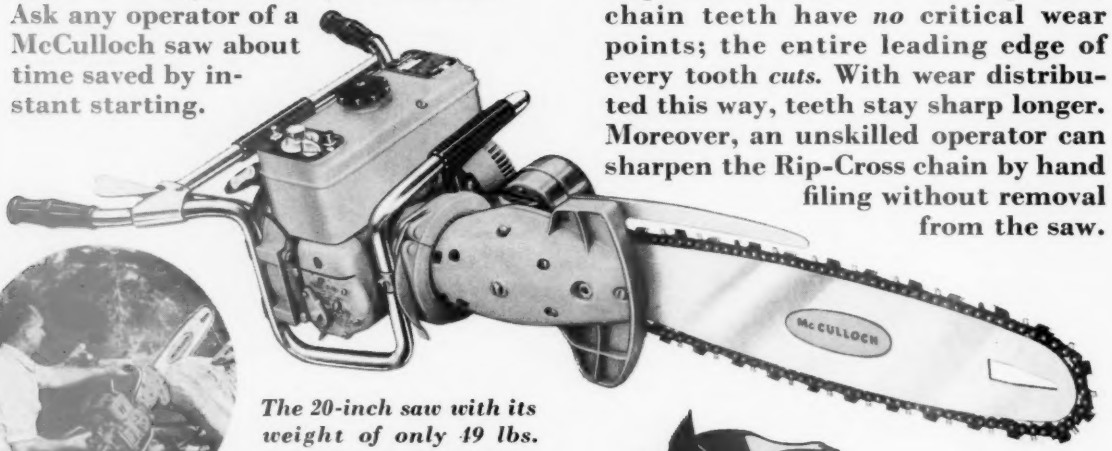

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ALONG THE WAY With . . . EDW. SCANLON

■ I HOPE its a long, long, WARM SUMMER we're coming into; even if I CAN'T BULLY the CIRCULATION MANAGER into cutting the GRASS AGAIN.

■ *Well, well, AT LAST IT HAS HAPPENED—we have lured DANA BOWERS (STATE LANDSCAPE ENGINEER) out of his BELOVED CALIFORNIA. Never before has THIS HAPPENED. He hopped, or rather, CREAKED A LITTLE, (he's three years older SINCE LAST I SAW HIM,, and he was not chicken then, as HE UNLOADED from a UNITED AIR LINES ship at CLEVELAND AIRPORT the other midnight. What a BULL SESSION we had.*

■ Again, ED REX of the JERSEY DEPT. OF AGRICULTURE, has done a COMMENDABLE JOB in his HANDLING of the second DUTCH ELM DISEASE CONTROL CONFERENCE (New York Feb. 17-18). MEETINGS SUCH AS THIS on SPECIFIC TREE PROBLEMS bring out many things that a GENERAL SYMPOSIUM would have to OVERLOOK. The NATIONAL SHADE TREE CONFERENCE might well SPONSOR such a YEARLY MEETING, other than the regular conference—say ON OAK DISORDERS.

■ *THIS DOES IT. That ROCHESTER character, JACOB THE GERLING sends a clipping wherein the MISGUIDED COLUMNIST refers to him as the "BEST PARK MAN IN THE U. S."—then APOLOGIZED and in a LATER EDITION changed it to "BEST IN THE WORLD." He's been going around SPREADING CINDERS—it says—WHAT ELSE?*

■ Wish YOU NURSERYMEN would let us know WHAT GOOD and UNUSUAL STOCK you have ON HAND. We get LOTS OF REQUESTS for SUCH DOPE.

■ *MASSACHUETTS and OHIO arborists HAVE A CHANCE to do themselves a GOOD TURN if they ACT WISELY AND QUICKLY to assure SUPPORT FOR BILLS now before their STATE LEGISLATURES. The OHIO Bill is H. B. 256 "TO REGULATE THE PRACTICE OF ARBORICULTURE"—and brother IT NEEDS IT. The MASSACHUSETTS Bill is Senate Bill No. 449—"AN ACT REGULATING THE BUSINESS OF ARBORICULTURE." Don't be HALF SAFE, support THESE ACTS and let's GET THIS BUSINESS out of THE SHOEMAKER CLASS.*

■ ANOTHER MASSACHUSETTS bill is H. B. No. 661—"AN ACT PROVIDING FOR LABORATORY EQUIPMENT AND RESEARCH work relative to shade and ornamental tree insects, diseases and maintenance at the WALTHAM STATION OF THE UNIVERSITY OF MASSACHUSETTS." George Abbott, Tree Warden of Andover, SENT THIS DOPE with the note that only ONE DISSENTING VOICE was heard—that of the SECRETARY OF THE MASS. PARK AND FOREST ASS'N. Funny! He OUGHT TO BE FOR IT 100%.

Anyway GET OUT THOSE LETTERS you MASS. and OHIO guys. You can't do it by hoping.

■ *RUSH MARSHALL writes about the MASS. Bill No. 661. "IT WILL BE A WONDERFUL INSPIRATION TO ALL OF US IN THE SHADE TREE GAME TO SEE THE WORK COME INTO ITS OWN." Good—Rush, and THANKS for the HEMLOCK STORY—and the SECOND SET of pictures—ha, ha.*

■ I've got to thank GEORGE GENS, NORTH RIDGE NURSERY, ELYRIA, OHIO for six very INTERESTING TREES. They are SALIX MATSUDANA TORTUOSA—the "twisted willow." This is a SEMI-UPRIGHT tree with TWISTED BRANCHES and a distinct VINE-LIKE APPEARANCE. Also have a bunch of rooted cuttings which I "swiped"—they're coming fine. Want one?

■ *DOC BLUME, down HOUSTON way, got himself a MIST BLOWER. His first demonstration was on the MAYOR'S PROPERTY—probably to COOL OFF the HOT AIR in the NEIGHBORHOOD.*

■ MIKE (Atom Mist) HARTNEY has just returned to HIS PALATIAL home at DEDHAM-ON-THE-PUNKIN after a RELAXING SOJOURN in BERMUDA (no less). MR. HARTNEY said his visit was CUT SHORT because his RACK—er—his BUSINESS needed HIS ATTENTION.

■ *Several GOOD MEETINGS on DUTCH ELM DISEASE have been held IN CLEVELAND during the PAST WINTER (I hope its past). NEAL LIMING, Paul Tilford, ARNOLD DAVIS and Charlie Irish did the SCHOOL MARMING and it LOOKS LIKE the LOCAL TREEMEN are WELL BRIEFED—except the SHARPSHOOTERS.*

■ CUYAHOGA COUNTY (Cleveland and surroundings) had 200 CONFIRMED cases of DED last year, and probably THAT MANY UNDETECTED. All signs point to a SEVERE EPIDEMIC this summer. Most of the SMALLER CITIES nearby are BUYING SPRAYERS and planning programs for SCOUTING, SANITATION AND SPRAYING. The area is WAKING UP.

■ *The CONN TREE PROTECTIVE ASSOCIATION at its meeting IN JANUARY elected BILL LUCKNER, Pres., RUSH MARSHALL, Vice-Pres., JOHNNY WOODRUFF, Secy-Treas., and HAROLD PERKINS, Editor. They indorsed NATIONAL ARBOR DAY—want a "SKINNING contest at BALTIMORE, and a GOOD PANEL session on DED, PIN OAK SAWFLY, 2, 4D and DDT.*

■ BEN DAVIS (no relation to the apple) of 518 FREDERICK ST., 'FRISCO (I just do that 'cause SAN FRANCISCO don't like it) has a BUSINESS FOR SALE. He wants TO GET OUT of the tree business and GET INTO fruit tree growing. (BEN DAVIS I'll bet).

■ *We're DOING QUITE WELL on this LEGISLATIVE recognition of NATIONAL ARBOR DAY, thanks to a LOT OF GUYS who are BEATING THEIR BRAINS OUT as state chairmen. The slogan is "GREEN-UP AMERICA."*

■ FRANK PIPAL wants to know "why pick the LAST FRIDAY IN APRIL AS ARBOR DAY?"—"Why not APRIL 22, JOHN MORTON'S BIRTHDAY" — because of the SCHOOLS FRANK, this way it ALWAYS WILL BE on a FRIDAY.

■ *Sent some SOPHORA JAPONICA seed to our friend R. C. McMILLAN, Director of Parks, MANCHESTER, ENGLAND. It will be INTERESTING TO LEARN if he encounters the GROWING PROBLEM, BROOMING, that we have. Once this IS OVERCOME the SOPHORA should go far.*

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Vol. 9 Bi-Monthly No. 3

Subscription Price $2.00 Per Year (Foreign $2.50) 35 Cents Per Copy Box 5607, Cleveland, Ohio

The Editors of TREES invite discussions, comments and all types of literary materials pertaining to trees and tree preservation from any person engaged either in the scientific advancement or commercial development of the field.

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■ ANYONE in this PART OF THE COUNTRY, or anyone INTERESTED IN ECOLOGY will find DR. ARTHUR B. WILLIAMS' treatise on "THE NATIVE FORESTS OF CUYAHOGA COUNTY, OHIO" a valuable and INTERESTING WORK. Much LOCAL COLOR and ONLY A BUCK—see book reviews.

■ *GEORGE GOODALL, Goodall Tree Expert Co., PORTLAND ME., has a schedule of TREE TALKS to Garden and Service clubs, WHICH IS GOOD. It's surprising the INTERESTING RESPONSE, especially from Service Clubs, when ONE DISCUSSES things ABOUT TREES.*

■ On PAGE 6 is the article by DR. RUSS WHITTEN giving the OFFICIAL U.S.D.A. recommendations for CONTROL OF THE INSECT VECTORS of the DUTCH ELM DISEASE and PHLOEM NECROSIS. If you are INTERESTED in REPRINTS of this, or other ARTICLES in TREES, write IMMEDIATELY FOR PRICES. Place YOUR ORDER before this type is BROKEN UP.

■ *The "OPERATOR SPRAYING EXPERIENCES" on Page 13 WILL BE CONTINUED in the next ISSUE.*

■ "GREEN-UP AMERICA" is the slogan of the COMMITTEE FOR NATIONAL ARBOR DAY. Use it on your LETTERHEADS and OTHER PRINTED MATTER. You WON'T BE SUED for PLAGIARISM.

■ *Methinks they'll HAVE A TOUGH TIME keeping DANA, THE CALIFORNIA, BOWERS away from the OHIO STATE UNIVERSITY ROADSIDE SHORT COURSE from now on. This is a SPLENDID THING that DALLAS DUPRE and PROF. SUTTON have RAISED TO THE STATUS of one of the FINEST EDUCATIONAL meets in THE COUNTRY.*

Observe NATIONAL ARBOR DAY Last Friday in April

Mar.-Apr., 1949 **Journal of the National Arborist Association** Vol. 9 No. 3

EDWARD H. SCANLON, Editor
Box 5607, Cleveland, Ohio
Phone ORchard 0341

"No place is complete without trees. A home without trees is charmless; a road without trees is shadeless; a park without trees is purposeless; *a country without trees is hopeless*"

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Out on a Limb

STOP, LOOK AND STUDY

There no doubt is confusion in the minds of laymen when they detect the indecision or confusion apparent in the manner in which the arborist discusses Dutch elm disease control.

The fact arises from the insufficient time and research done since the advent of the insecticide DDT into the control program. This material has only been used, in quantities worth mentioning, since the end of the war. It was not known before, nor was it available during the war. Consequently all research, on the subject of its effects on the Scolytus beetle, date from 1946 and for matters of record only from 1947. This is entirely too short a time upon which to base conclusive answers.

There are factors of weather, timing and biologic control that may not show up for years and they may not yet have become evident.

Much has been said for, and there is tangible evidence to prove the worth of sanitation, as an adjunct to the DED program. However, prior to the discovery of DDT none of the known insecticides had proven effective in control. In spite of the great amount of sanitation work accomplished by the USDA and other agencies in the thirties, the Dutch elm disease continued to spread.

It has been proven beyond a doubt that DDT is toxic to the scolytus beetle. It remains merely to work out the best means of application, the time, manner and amount. This then can be correlated with a sound sanitation program, and perhaps we may accomplish what many seem to think is not possible—control to an acceptable minimum.

Arborists should think out, seriously, their approach to the Dutch elm disease problem. Not act hastily and endanger the withdrawal of public support. This support is badly needed, but if the arborist becomes "money hungry" he is seriously in danger of blighting his calling and may contribute to a catastrophe that could result in the loss of the elm tree in American culture.

MEMBERSHIP IN N. A. A.

A subscription to TREES Magazine and membership in the National Arborist Association are not one and the same.

Unfortunately several months ago one of our subscribers was called to task because he had assumed this to be so. He had indicated in his advertising that he was a member of the

National Arborist Association. However, he promptly corrected the impression he had inadvertently created.

The explanation was that unthinkingly he had likened his subscription to the privilege of membership in the American Forestry Association that goes with subscription to "American Forests." We cannot feel that we are too much to blame, this being the only record of such an incident that has come to our attention, but we feel that to avoid a recurrence it seemed that a mention should be made.

The National Arborist Association is an organization that ably represents the profession of arboriculture. It has certain membership requirements and a schedule for dues that can be obtained by contacting its secretary, Dr. Paul E. Tilford, Box 426, Wooster, Ohio. The many fine accomplishments of the organization in the interests of all arborists, certainly should place membership high on the "must" list if every arborist who also considers himself a good business man.

TREES magazine is the official journal of the National Arborist Association but there is no financial or editorial tie-up. It is merely an affiliation that was deemed a step in the direction of sound unity in the field. That purpose seems to have been well served.

NAA NEWS

By Paul E. Tilford, *Secretary*

Box 426, Wooster, Ohio

Disposal of Brush and Wood

After listening to the discussions this past winter at shade tree meetings on the disposal of brush, waste wood and stumps, one concludes that the only practical means of disposing of this material in most instances is to burn it. It is true that equipment is available that will reduce brush and good-sized branches to chips which can be used as fuel, soil mulch or possibly other purposes. But this equipment is expensive and it will be a long time, if ever, before most brush and waste wood is disposed of by this method. The "dump" will continue to be the place where a large percentage of this material goes.

The City Park or Shade Tree Department usually can use the city dump and in some cities the private operators have the same privilege. But in many cities the private arborist or tree expert is not permitted to haul brush, stumps and waste wood to the city dump. He has abused the privilege so often, the city officials say, that their only recourse is to close the dump for his use. No doubt the privilege to haul brush and waste wood to the city dump has been abused many times. It is easy to understand why the city feels it is justified in its action. It is doubtful if the tree men abuse the privilege of using the dump any oftener than anyone else who might take material to a dump where there is no supervision. It just seems to be human nature to dump rubbish in the easiest possible place, if we can get away with it. It would seem that the answer to the dump problem would be for the city to furnish supervision at the dump.

When Dutch elm trees are taken down it is imperative that they be destroyed or made safe by spraying so that beetles will not emerge and carry the disease to other trees. If the private tree company cannot take these diseased trees to the dump where they will be burned, a lot of them will not be destroyed before the beetles emerge. From the standpoint of helping to protect the city elms it would seem almost imperative that officials help the private operator to dispose of beetle-infested wood at city dumps under city supervision. A little better cooperation on the part of all concerned should solve this problem. One thing for sure is, the private tree man can't take the diseased trees home and eat them.

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GREEN-up AMERICA

Control of Insect Carriers of the Dutch Elm Disease and Elm Phloem Necrosis

By R. R. Whitten

United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine

The Dutch elm disease and elm phloem necrosis are the two most destructive diseases of elm in the United States. Both of these diseases are causing epidemics that are killing elm trees in many of the Eastern and Midwestern States.

The following recommendations for the control of the insects that act as carriers of these two elm diseases are based on the results of experiments that were conducted during the last few years.

Insect Carriers

The Dutch elm disease is spread by elm bark beetles, principally by the smaller European elm bark beetle, *Scolytus multistriatus* (Marsh.). This beetle carries on its body the fungus that causes Dutch elm disease. The fungus is introduced into healthy living elm trees when the beetles feed in the twig crotches and in the leaf axils. Since this insect breeds only in dead, dying, or recently cut elm wood, trees killed by the Dutch elm disease or phloem necrosis are ideal breeding places. The adults of the smaller European elm bark beetle are active during the entire elm foliar season.

Distribution of the Dutch elm disease and its principal carrier, the smaller elm bark beetle, is shown in figure 1.

It is known that elm phloem necrosis is spread by a leafhopper, *Scaphoideus luteolus Van D.* This small insect feeds on the under side of elm leaves by sucking out the plant juices. It is during this feeding that the virus causing phloem necrosis is introduced into healthy trees. The eggs of *S. luteolus* are laid in the outer bark of living elm trees and the leafhopper passes the winter in this stage. The young, or nymphs, of this insect first appear about the time elm leaves begin to develop. From five to seven weeks later they transform into adults that are present in the field throughout the entire summer.

Distribution of elm phloem necrosis and its leafhopper carrier is shown in figure 2.

Control

Control of Dutch elm disease and of phloem necrosis, to the best of our knowledge, depends on preventing bark-beetles and leafhoppers from feeding on healthy elm trees. These disease carriers can be controlled under favorable conditions with sprays containing DDT, provided they are correctly formulated, properly applied, and used in a sufficient quantity at the right time.

The following formulations, when diluted with water, have been found to be non-injurious to elm trees and when properly applied produce residues that remain effective for long periods of time. These formulations were prepared in the laboratory. Several of the commercially prepared DDT concentrates were found to be too injurious to elm trees when used at the required concentrations. Undoubtedly, many insecticide manufacturers will produce DDT-emulsion concentrates that are safe for use on elm at high concentrations, when the demand for them is made known.

Formula A

16 pounds of technical DDT dissolved in a mixture of 2¼ gallons of benzene and 1 gallon of Velsicol AR-50 (chiefly mono- and di-methylnaphthalenes). To this solution add 1 pint of Triton X-100 (an aralkyl polyether alcohol).

Formula B

16 pounds of technical DDT dissolved in 4 gallons of xylene. To this solution add 1 pint of Triton X-100.

Formula C

20 pounds of technical DDT dissolved in a mixture of 5 gallons of xylene and 2½ gallons of Acme white oil (a horticultural white oil having a viscosity (Saybolt at 100° F.) of 80-85 seconds and an unsulfonatable residue of 95 per cent. To this solution add 1¼ pints of Triton X-100.

Warning: Caution should be exercised in handling the DDT solvents, as they are inflammable and concentrations of the fumes may be toxic. In handling the concentrated mixtures one should take care that they are not brought in contact with the skin for prolonged periods. Skin surface should be washed with soap and water soon after exposure.

These DDT-emulsion concentrates may be stored for indefinite periods of time if kept in tightly sealed containers in a warm place.

A Control for the Carrier of the Dutch Elm Disease

The bark beetle carrier of the Dutch elm disease infects healthy elm trees when it feeds in the twig crotches and in the leaf axils. To prevent this feed-

(Continued on page 25)

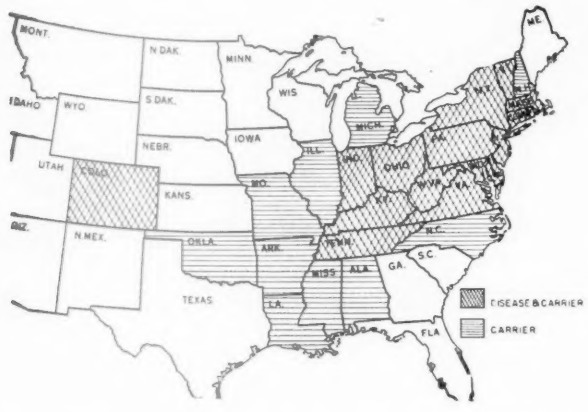


Fig. 1.—Distribution of the Dutch elm disease and its principal carrier, the smaller European elm bark beetle.

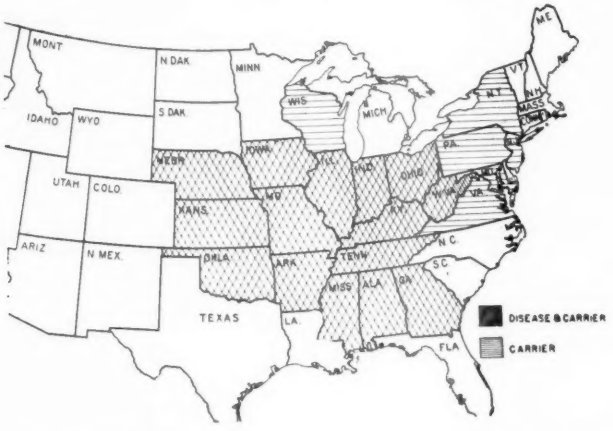


Fig. 2.—Distribution of elm phloem necrosis and its leaf hopper carrier.

Greenwich Report on DDT for Scolytus

By J. A. Dietrich, *Tree Warden and* J. Balin, *Assistant*
Greenwich, Conn.

In order to determine the effectiveness of a dormant DDT spray program on control of the elm bark beetle under actual field conditions, plots of from 50 to 100 trees were selected for this work. These trees averaged 24" in diameter and ranged in height from 50 to 75 feet.

The first group was sprayed with 8 pints of a 12.5% emulsifiable DDT commercially prepared on April 6th. The other groups were sprayed with the same strength DDT using 5 pints, 3 pints 2-2/3 pints and 2 pints per tree.

Commencing on May 20th twig samples were collected from the top, center and the base of trees selected at random from the sprayed groups. These twigs were put into glass containers and a counted number of bark beetles released in each group. In addition, to check the findings, one container with beetles and unsprayed twigs was set up for each group of jars.

The results of this program are indicated in the data contained in the tables which follow.

A summary of the findings would seem to indicate that in the case of sprayed twigs where from 5 to 8 pints of spray material was applied per tree no feeding scars were noted, and beetles were dead within a day. In the case of the unsprayed twigs, used as a check, the beetles fed vigorously disappearing from sight in crotches and lived up to 6 days. In the case of applications below the 5 pint per tree figure, similar results are indicated, excepting that shallow feeding scars were noticed in a few instances as shown in the figures. It was further noted that where feeding occurred the sample had been taken from the field side of the highway.

It was found that when beetles were released in a jar containing a sprayed twig and an unsprayed twig, feeding took place on only the unsprayed twig.

Another series of tests were run to determine the period of time beetles are affected by sprayed surfaces once exposed to them. Beetles were allowed to remain in jars with sprayed twigs for periods starting from one hour up to three hours; then removed into containers of unsprayed twigs. Those exposed for only one hour seemed unaffected and lived and fed for six days with one alive for 10 days. The effects after exposure for over one hour are similar to those found in the other tests with beetles existing for about one day. These findings are more clearly indicated in the tables under Contamination Tests.

Further observations were noticed on the activity of the beetles upon emerging from beetle wood. A period of inactivity, lasting up to one hour was typical. Following this, the beetles become very active and did considerable exploring and traveling over all sections of the twigs before settling down to feeding. It was perhaps due to the period of inactivity that no results were obtained on the one hour contamination test.

Photo Courtesy Greenwich Tree Dept.

A corner of the laboratory where the tests described by the authors were conducted.

It should be noted that control seemed to be present from April 6 up till June 9, with periods of heavy rains following the initial application of spray.

A mist blower was utilized for this spray program using a .063 size nozzle and also a .086 nozzle.

As indicated in the tables, a commercial spreader employing Technical Mannitan Monolaurate and derris extractives were used in some plots.

Time and labor permitting, twig samples will again be taken during the late summer months to see if the DDT residue is still effective.

Observation of the various plots during the remainder of the season has indicated that trees sprayed with the heavier application of material showed no new outbreaks of the Dutch elm disease. The aphid population was heavy and some red mite were present. Conditions for these pests were excellent this season and were also noted in heavy outbreaks in areas where no DDT spraying was undertaken.

In areas of lighter applications scattered outbreaks of Dutch elm disease appeared as usual though not on as large a scale as was apparent in other sections of the state.

Other observations noted were that about 85% of all elms which broke out with the disease showed symptoms in the tops and field side of the tree, indicating that in the areas of light application insufficient time spent at each tree resulted in poor coverage.

Due to the accomplishment of other maintenance work the proposed plan to take late season samples had to be abandoned.

Following a program of pruning, spraying, feeding and removal of elm trees identified as victims of the Dutch elm disease, a definite drop in new infections in town-maintained trees has been noted. Figures below are for a three-year period and are compiled from an elm population of approximately 6000 trees.

1946—189 Elm trees with Dutch elm
1947—114 Elm trees with Dutch elm
1948— 51 Elm trees with Dutch elm

It is felt that the results obtained and the drop in new outbreaks of the Dutch elm disease cannot be definitely laid to any one item in the program that was followed. A well defined maintenance program, diligently adhered to, certainly has paid dividends insofar as the preservation of the elms in Greenwich are concerned.

(Continued on next page)

GROUP "A"

Material: 25% DDT Resitox (Shell) emulsifiable
% used: Cut to 12.5% with water
Amt. per tree: Average 8 pints per tree
No. of trees: 46 trees
Jet size: .063—Mist blower Height of tree 50 to 60 ft.
Date sprayed: April 6th

(a)

Test Jar No. 1 ..... (healthy twigs)

6 days	May 20	2 pm	6 live beetles
	May 21	2 pm	6 live beetles
	May 22	12 noon	6 live beetles
	May 24	1:30 pm	5 live beetles
	May 25	11 am	3 live beetles
	May 26	9 am	2 live beetles
	May 26	4 pm	0 live beetles

Note: Very deep feeding scars in crotches of twigs, beetles feeding regularly.

(b)

Sprayed sample jar	Bottom of tree No. 1	Jar No. 1 C	
1 day	May 20	2 pm	5 live beetles
	May 21	4 pm	0 live beetles

Note: No feeding or scars on twigs.

(c)

Sprayed sample jar	Center of tree No. 1	Jar No. 1 D	
1 day	May 20	2 pm	4 live beetles
	May 21	4 pm	0 live beetles

Note: No feeding indicated on twigs.

(d)

Sprayed sample jar	Top of tree No. 1	Jar No. 1 B	
1 day	May 20	2 pm	4 live beetles
	May 21	4 pm	0 live beetles

Note: No feeding indicated on twigs.

Sprayed sample jar	Center tree No. 2	Jar No. 1 E	
2 days	May 20	2 pm	4 live beetles
	May 21	8 am	1 live beetle
	May 22	8 am	0 live beetles

Note: No visible feeding scars, but some dust in jar.

(f)

Sprayed sample jar	Top of tree No. 2	Jar No. 4 A	
2 days	May 25	11:45 am	5 live beetles
	May 26	10.00 am	4 live beetles
	May 27	1:15 pm	0 live beetles

Note: Slight feeding scar on 1 twig.

(g)

Sprayed sample jar	Bottom of tree No. 2	Jar No. 5	
1 day	May 26	10:30 am	3 live beetles
	May 27	10:30 am	0 live beetles

Note: Very faint feeding scar.

(h)

Sprayed bark test	Tree No. 1	Jar No. 1 A	
	May 20	2 pm	3 live beetles
	May 21	2 pm	2 live beetles
	May 22	2 pm	0 live beetles

(i)

Sprayed bark test	Tree No. 2	Jar No. 3 D	
	May 24	4 pm	5 live beetles
	May 25	11 am	2 live beetles
	May 26	9:40 am	0 live beetles

GROUP B

Material: 25% Resitox DDT (Shell) emulsifiable
% used: Cut to 12.5% with water
Amt. per tree: Average 5 pts. per tree
No. of trees: 80 trees
Jet size: .063
Date sprayed: April 9th

(a)

Test Jar No. 8 (healthy twigs)

May 27	2 pm	5 live beetles
May 28	10:20 am	5 live beetles
May 29	10:30 am	3 live beetles
June 1	10:30 am	2 live beetles
June 2	10:05 am	2 live beetles
June 3	10:00 am	0 live beetles

Note: Beetles feeding regularly, very deep feeding scars.

(b)

Sprayed sample jar	Top of tree No. 1	Jar No. 8 B	
	May 27	3 pm	5 live beetles
	May 28	10:30 am	3 live beetles
	May 29	10:50 am	0 live beetles

Note: No feeding scars.

(c)

Sprayed sample jar	Center of tree No. 1	Jar No. 8 D	
	May 27	3 pm	5 live beetles
	May 28	11:15 am	1 live beetle
	May 29	11:00 am	1 live beetle
	June 1	12:40 pm	0 live beetles

Note: No visible scars—1 beetle lived 3-4 days.

(d)

Sprayed sample jar	Bottom of tree No. 1	Jar No. 8 E	
	May 27	3 pm	5 live beetles
	May 28	11:20 am	2 live beetles
	May 29	11:00 am	0 live beetles

Note: No visible feeding or scars.

(e)

Sprayed bark test	Tree No. 1	Jar No. 3 C	
	May 24	4 pm	5 live beetles
	May 25	11:30 am	4 live beetles
	May 26	9:40 am	0 live beetles

(f)

Sprayed sample jar	Mass Test—Bottom No. 1	Jar No. 7	
	May 26	10:30 am	18 live beetles
	May 27	2 pm	2 live beetles
	May 28	10:10 am	0 live beetles

Note: Within 27 hours—16 out of 18 beetles were dead—only 1 small feeding scar.

GROUP C

Material: Mistona DDT 12% (Shell)
% used: Used full strength 12%
Amt. per tree: Average 3 pts.
No. of trees: 111 trees
Jet size: .063
Date Sprayed: April 20th

(a)

Test Jar No. 9

May 28	1:30 pm	8 live beetles
May 29	10:05 am	8 live beetles
June 1	1 pm	2 live beetles
June 2	10:10 am	2 live beetles
June 3	10:10 am	2 live beetles
June 4	10:10 am	0 live beetles

Note: Beetles feeding regularly; very deep scars, beetles buried in crothes.

(b)

Sprayed sample jar	Bottom of tree No. 1	Jar No. 9 B	
	May 28	1:30 pm	5 live beetles
	May 29	10:15 am	2 live beetles
	June 1	1:30 pm	1 live beetle
	June 2	10:15 am	0 live beetles

Note: Very deep feeding scar in one twig only.

(c)

Sprayed sample jar	Top of tree No. 1	Jar No. 9 C	
	May 28	1:40 pm	5 live beetles
	May 29	10:15 am	4 live beetles
	June 1		0 live beetles

Note: Very faint scar in crotch of one twig only.

(d)

Sprayed sample jar	Center of tree No. 1	Jar No. 2 C	
	May 22	11:00 am	4 live beetles
	May 24	1:40 pm	1 live beetle
	May 25	10:00 am	1 live beetle
	May 25	3:45 pm	0 live beetles

Note: Deep feeding scar in crotch of 1 twig.

(e)

Test Jar No. 2

May 21	2 pm	6 live beetles
May 22	11:00 am	2 live beetles
May 24	1:30 pm	2 live beetles
May 25	11:10 am	2 live beetles
May 26	9:30 am	1 live beetle
May 26	12:45 pm	0 live beetles

Note: Heavy feeding—deep scars.

(f)

Sprayed sample jar	Top of tree No. 2	Jar No. 2 A	
	May 22	10:30 am	4 live beetles
	May 24	9:00 am	0 live beetles

Note: Some feeding scars—light feeding.

(g)

Sprayed sample jar	Center of tree No. 2	Jar No. 4 B	
	May 25	11:45 am	5 live beetles
	May 26	10:00 am	1 live beetle
	May 27	1:10 pm	0 live beetles

Note: No scars—no feeding.

(h)

Sprayed sample jar	Bottom of tree No. 2	Jar No. 9 D	
	May 28	1:40 pm	5 live beetles
	May 29	10:40 am	3 live beetles
	June 1	1:30 pm	0 live beetles

Note: Faint scar on 1 twig, no feeding.

(i)

Test Jar No. 4

May 25	11:45 am	5 live beetles
May 26	9:50 am	5 live beetles

(Continued on page 10)

Dutch Elm Disease Conference

Meeting at the Hotel New Yorker in New York, Feb. 17 and 18 the above group discussed the many scientific aspects of Dutch elm disease and its insect vectors. It was one of the most productive meetings ever held in the annals of shade tree preservation. Its success is certain to result in further meetings on other specific shade tree prob'ems. Seated left to right: Dr. O. N. Liming, Dutch Elm Disease Laboratory, U.S.D.A., East Orange, N. J.; Dr. W. Howard Rankin, State Dept. of Agriculture, Albany, N. Y.; Dr. Donald Welch, Cornell University, Ithaca, N. Y.; Mr. Horace V. Wester, National Park Service, Washington, D. C.; Dr. Curtis May, Principal Pathologist, Bureau of Plant Industry, U.S.D.A., Beltsville, Md.; Dr. J. G. Conklin, State Department of Agriculture, Durham, N. H.; Mr. Edgar G. Rex, State Department of Agriculture, Trenton, N. J.; Dr. M. A. McKenzie, University of Massachusetts, Amherst, Mass.; Dr. John G. Matthysse, Cornell University, Ithaca, N. Y.; Dr. Rene Pomerleau, Dept. of Lands and Waters, Quebec, Canada.—Standing from left to right: Dr. K. G. Parker, Cornell University, Ithaca, N. Y.; Dr. Frank Howard, Agricultural Experiment Station, Kingston, R. I.; Dr. E. M. Craighead, Dept. of Forests and Waters, Harrisburg, Penna.; Dr. W. F. Jeffers, University of Maryland; Mr. Bailey, Entomologist, Dept. of Agriculture, Vermont; Dr. Ronald Bamford, University of Maryland; Dr. M. C. Richards; Dr. Wm. F. Becker, University of Massachusetts; Mr. John W. Batson, Supt. of Trees, Washington, D. C.; Dr. Bill Wilford, Dutch Elm Disease Laboratory, U.S.D.A., East Orange, N. J.; Dr. R. R. Whitten, Division of Forest Insects, U.S.D.A., Columbus, Ohio; Dr. George H. Plumb, Agricultural Experiment Station, New Haven, Conn.; Mr. Edward H. Scanlon, Commissioner of Shade Trees, Cleveland, Ohio; Dr. Kent Stewart, Dept. of Agriculture, Ottawa, Canada; Dr. D. E. Parker, Division of Forest Insects, U.S.D.A., Beltsville, Md.; Mr. Harold B. Girth, Dept. of Agriculture, Trenton, N. J.; Dr. Albert E. Dimond, Agricultural Experiment Station, New Haven, Conn.; Dr. A. W. McCallum, Dominion Dept. of Agriculture, Ottawa, Canada; Mr. L. L. Reed, Dominion Dept. of Agriculture, Ottawa, Canada.

By Edward H. Scanlon

During the period when the Federal Bureau of Entomology and Plant Quarantine conducted Dutch elm disease scouting and eradication work in the known infected states frequent meetings of concerned research and control officials were held for the coordination of activities and report of progress. This Federal sponsorship terminated in 1941. Realizing the need for the assembly of plant pathologists and entomologists to resume the discussion of mutual problems the New Jersey Department of Agriculture sponsored an elm bark beetle control conference in January, 1948. The attendance at this conference was excellent, the interest gratifying and the results most beneficial. The second conference on this subject was recently held in New York City, this time the discussion extending over two days. The first day was devoted to the discussion of elm bark beetle control researches and the second day to the discussion of Dutch elm disease control policies in the various active states.

These meetings again demonstrated the desirability of convening research workers so as to permit them to examine the research results already realized as well as the research projects currently operative. As can well be assumed the concentration of the attention of fifteen entomologists representing the Dominion of Canada, the New England and Middle Atlantic States and Ohio enabled individuals with mutual interests to gain first-hand information through verbal discussion of the complexities of the several problems as well as the fields of progress. The introduction of DDT for the control of the Dutch elm disease carrying bark beetles has injected a research problem, not only involving the preparation of the most effective formulation, but also the devising of machinery to project this insecticide to the outermost parts of the tree where much of the bark beetle feeding takes place.

Furthermore, the control policies of the states actively engaged in Dutch elm disease control were presented for critical examination and appraisal. Obviously no attempt was made to unify opinion regarding policies inasmuch as conditions for control prevailing in Canada, the New England States and Pennsylvania are not identical. However, the many statements presented in these two conferences will permit the preparation of a summary which will be known as a special committee report. This report will attempt to reduce to practical field levels the concrete information which has been adduced to date. The Special Committee Report of the 1949 Conference will be presented in the forthcoming issue of Trees Magazine.

GREENWICH DDT REPORT

(Continued from page 8)

May 27	1:00 pm	3 live beetles
May 28	9:30 am	2 live beetles
May 29	10:45 am	2 live beetles
June 1	10:15 am	0 live beetles

Note: Heavy feeding—plenty of scars.

(j)

Sprayed sample jar — Top of tree No. 3 — Jar No. 4 C

May 25	11:45 am	5 live beetles
May 26	10:05 am	1 live beetle
May 27	1:10 pm	1 live beetle
May 27	4:30 pm	0 live beetles

Note: No feeding or scars on any of the twigs.

(k)

Sprayed sample jar — Center of tree No. 3 — Jar No. 8 A

May 27	3:00 pm	5 live beetles
May 28	10:25 am	2 live beetles
May 29	10:45 am	0 live beetles

Note: No feeding or scars.

(l)

Sprayed sample jar — Bottom of tree No. 3 — Jar No. 2 B

May 22	10:30 am	4 live beetles
May 24	1:30 pm	2 live beetles
May 25	8:00 am	0 live beetles

Note: No feeding scars.

(m)

Bark test — Tree No. 3 — Jar No. 3 B

May 24	4:00 pm	5 live beetles
May 25	11:30 am	4 live beetles
May 26	9:30 am	2 live beetles
May 27	12:50 pm	1 live beetle
May 28	9:00 am	0 live beetles

Note: 1 beetle A.W.O.L.

GROUP D

Material: 25% Resitox DDT (Shell) emulsifiable
% used: Cut to 12.5% with water
Amt. per tree: 2⅔ pts. per tree
No. of trees: 54 trees
Jet size: .063
Date sprayed: April 9th

Test Jars No. 2 - 8 - 9

(a)

Sprayed sample jar — Top of tree No. 1 — Jar No. 2 D

May 22	11:00 am	4 live beetles
May 24	1:40 pm	0 live beetles

Note: No feeding or scars.

(b)

Sprayed sample jar — Center of tree No. 1 — Jar No. 6

May 27	2:30 pm	4 live beetles
May 28	1:30 pm	2 live beetles
May 29	11:00 am	0 live beetles

Note: No feeding or scars but some dust visible.

(c)

Sprayed sample jar — Top of tree No. 1 — Jar No. 9 E

May 28	1:45 pm	5 live beetles
May 29	10:10 am	3 live beetles
June 1	1:30 pm	0 live beetles

Note: No scars or feeding.

(d)

Test Jar No. 10

June 1	1:30 pm	6 live beetles
June 2	10:30 am	4 live beetles
June 3	10:20 am	2 live beetles
June 4	10:20 am	1 live bettle
June 5	10:30 am	1 live beetle
June 7		0 live beetles

Note: Heavy feeding—deep scars.

(e)

Sprayed sample jar — Bottom of tree No. 2 — Jar No. 10 A

June 1	2:30 pm	6 live beetles
June 2	11:00 am	1 live beetle
June 3	10:10 am	0 live beetles

Note: No feeding or scars.

(f)

Sprayed sample jar — Center of tree No. 2 — Jar No. 10 C

June 1	2:30 pm	6 live beetles
June 2	11:15 am	1 live beetle
June 3	10:10 am	0 live beetles

Note: Prominent scar in crotch of one twig.

(g)

Sprayed sample jar — Top of tree No. 2 — Jar No. 10 B

June 1	2:30 pm	6 live beetles
June 2	11:00 am	3 live beetles
June 3	10:15 am	1 live beetle
June 4	10:15 am	0 live beetles

Note: Deep feeding hole in one twig.

GROUP E

Material: Mistoil 12% DDT (Shell)
% used: 12% full strength
Amt. per tree: 2 pts. average per tree
No. of trees: 23 trees
Jet size: .063
Date Sprayed: April 20th

Test Jars No. 2 - 9 - 8

(a)

Sprayed sample jar — Top of tree No. 1 — Jar No. 2 E

May 22		4 live beetles
May 24		2 live beetles—1 lost
May 25		0 live beetles

Note: 1 beetle lost—2 beetles were buried deep in crotches on one twig, feeding.

(b)

Sprayed sample jar — Center of tree No. 1 — Jar No. 9 A

May 28	1:30 pm	5 live beetles
May 29	10:00 am	5 live beetles
June 1	1:00 pm	0 live beetles

Note: Regular feeding scar in crotch—one twig.

(c)

Sprayed sample jar — Bottom of tree No. 1 — Jar No. 8 C

May 27	3:00 pm	5 live beetles
May 28	11:00 am	3 live beetles
May 29	11:00 am	2 live beetles
June 1	12 noon	0 live beetles

Note: Heavy feeding scars.

(d)

Bark test — Tree No. 1

May 24	4:00 pm	4 live beetles
May 25	11:00 am	1 live beetle
May 26	9:30 am	0 live beetles

GROUP F

Material: Mistona 12% DDT (Shell) plus "Tec"
% used: 12% full strength DDT—1-40 "Tec"
Amt. per tree: Average 2 pts. per tree
No. of trees: 180 trees
Jet size: .086
Date sprayed: April 29th-30th

(a)

Test Jar No. 11

June 1	1:30 pm	7 live beetles
June 2	2:30 pm	3 live beetles
June 3	10:30 am	3 live beetles
June 3	2:30 pm	2 live beetles

Note: 2nd test on Test No. 11. The fresh twigs in jar No. 11 were put in after handling 50% DDT powder.

(a2)

Test Jar No. 11 (second test)

	June 3 — 1:30 pm	7 live beetles
	June 4 — 10:30 am	7 live beetles —buried
9 days	June 5 — 11:00 am	7 live beetles —in crotch
	June 7	6 live beetles —in crotch
	June 8 — 9:45 am	6 live beetles
	June 9 — 9:50 am	5 live beetles
	June 10 — 10:00 am	4 live beetles
	June 11 — 1:00 pm	2 live beetles —(1 dead in crotch)
	June 12 — 9:30 am	0 live beetles

Note: Plenty of feeding—deep scars—1 bettle dead in crotch.

(b)

Sprayed sample jar — Top of tree No. 1 — Jar No. 11 A

	June 1	2:30 pm	6 live beetles
2 days	June 2	2:45 pm	1 live beetle
	June 3	10:30 am	0 live beetles

Note: No scars or feeding visible.

(c)

Sprayed sample jar — Bottom of Tree No. 1 — Jar No. 11 F

	June 1	2:30 pm	6 live beetles
	June 2	2:30 pm	5 live beetles
3 days	June 3	10:40 am	2 live beetles
	June 4	10:30 am	0 live beetles

Note: Large feeding scar on one twig—2 beetles were feeding in same crotch.

(d)

Sprayed sample jar — Top of tree No. 2 — Jar No. 11 B

	June 1	2:30 pm	6 live beetles
3 days	June 2	2:40 pm	2 live beetles
	June 3	10:40 am	1 live beetle —weak
	June 4	10:40 am	0 live beetles

Note: Light feeding scars on 3 twigs.

(e)

Sprayed sample jar	Bottom of tree No. 2	Jar No. 11 D
June 1	2:30 pm	6 live beetles
3 days June 2	2:50 pm	4 live beetles —feeding
June 3	10:30 am	2 live beetles
June 4	10:30 am	0 live beetles

Note: 2nd day 2 buried in crotch—4 feeding scars—reg.

(f)

Sprayed sample jar	Bottom of tree No. 3	Jar No. 11 C
June 1	2:30 pm	6 live beetles
June 2	3:00 pm	0 live beetles

Note: No feeding scars—Quick kill.

(g)

Sprayed sample jar	Top of tree No. 3	Jar No. 11 E
June 1	2:30 pm	7 live beetles
June 2	2:30 pm	3 live beetles
June 3	10:50 am	0 live beetles

Note: No feeding scars.

GROUP G

Misc. Tests

(a)

Sample Jar No. 12

1 sprayed twig—(taken from group B—(d)
1 healthy twig—(notched)

June 3	2:30 pm	10 live beetles
June 4		3 live beetles
June 5		0 live beetles

Note: Only feeding was done on healthy twig—1 scar.

(b)

Sample jar — No. twigs		Jar No. 4 D
May 25	2:00 pm	6 live beetles
May 26	10:30 am	3 live beetles
May 27	10:00 am	1 live beetle
May 28	9:20 am	1 live beetle
May 28	4:30 pm	0 live beetles

(c)

Contamination Test No. 1

Beetles put in jars with healthy wood after contact with sprayed twigs. Twigs from group A—(g) Jar No. 5 used to contaminate beetles. 8 pints per tree "Res."

1 hour contamination		Jar No. 5 A
May 26	11:30 am	4 live beetles
May 27	1:30 pm	4 live beetles —buried
May 28	9:40 am	3 live beetles —feeding
May 29	10:45 am	2 live beetles —feeding
June 1	10:45 am	2 live beetles —feeding
June 2	10:00 am	1 live beetle —feeding
June 3	10:00 am	1 live beetle —feeding
June 4	10:00 am	1 live beetle —weak
June 5	10:10 am	1 live beetle —weak
June 7	8:00 am	0 live beetles —at last

Note: Plenty of feeding scars—one bettle lasted over 10 days.

(d)

Contamination Test	2 hr. cont.	Jar No. 5 B
May 26	12:30 pm	4 live beetles
May 27	1:40 pm	1 live beetle
May 28	9:50 am	0 live beetles

Note: No visible marks of feeding.

(e)

Contamination Test	3 hr. cont.	Jar No. 5 C
May 26	1:30 pm	4 live beetles
May 27	1:30 pm	0 live beetles

Note: No feeding scars—all dead in 24 hrs.

(f)

Contamination Test No. 2

Twigs taken from group D—(b)

1 hr. cont. 2⅔ pints "Res."		Jar No. 6 A
May 27	3:30 pm	5 live beetles
May 28	10:00 am	3 live beetles
May 29	10:30 am	2 live beetles
June 1	11:00 am	0 live beetles

Note: 4 feeding scars—light feeding.

(g)

Contamination Test	2 hrs. cont.	Jar No. 6 B
May 27	4:30 pm	7 live beetles
May 28	10:00 am	5 live beetles
May 29	10:30 am	1 live beetle
June 1	11:00 am	0 live beetles

Note: One deep scar in crotch only—not much feeding.

(h)

Test Jar No. 3 used to check against all bark tests in Group A and Group B

May 24	4:00 pm	6 live beetles
May 25	10:00 am	4 live beetles
May 26	10:00 am	3 live beetles
May 27	1:00 pm	2 live beetles
May 28	9:15 am	2 live beetles
May 29	10:30 am	1 live beetle
June 1	10:30 am	0 live beetles

Note: Very deep feeding scars in crotches.

GROUP H

8 pts. Resitox—April 6.

Same as Group A: 2nd Test Tree No. 1.

(a)

Test Jar No. 13

June 8	9:30 am	5 live beetles
June 9	9:30 am	1 live beetle
June 10	10:00 am	1 live beetle —buried

(b)

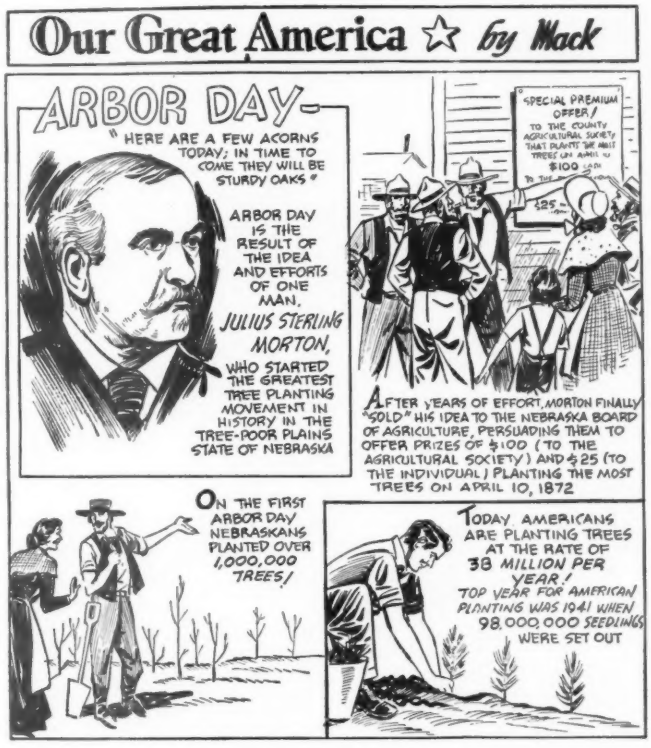
Sprayed sample jar	Top of tree No. 1	Jar No. 13 A
June 8	9:30 am	5 live beetles
June 9	9:30 am	0 live beetles

Note: No feeding or scars—all dead within 24 hours.

(c)

Sprayed sample jar	Bottom of tree No. 1	Jar No. 13 B
June 8	9:30 am	5 live beetles
June 9	9:30 am	0 live beetles

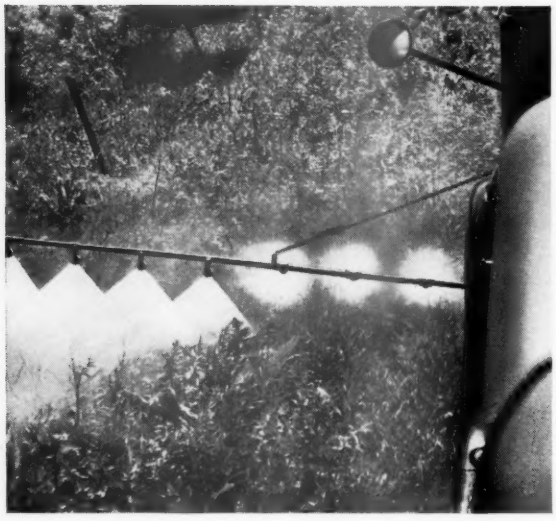
Note: No feeding or scars—all dead within 24 hours.


Our Great America ☆ by Mack
ARBOR DAY—
"HERE ARE A FEW ACORNS TODAY; IN TIME TO COME THEY WILL BE STURDY OAKS"
ARBOR DAY IS THE RESULT OF THE IDEA AND EFFORTS OF ONE MAN, JULIUS STERLING MORTON, WHO STARTED THE GREATEST TREE PLANTING MOVEMENT IN HISTORY IN THE TREE-POOR PLAINS STATE OF NEBRASKA
SPECIAL PREMIUM OFFER! TO THE COUNTY AGRICULTURAL SOCIETY THAT PLANTS THE MOST TREES ON APRIL 10 $100
TO THE INDIVIDUAL $25
AFTER YEARS OF EFFORT, MORTON FINALLY "SOLD" HIS IDEA TO THE NEBRASKA BOARD OF AGRICULTURE, PERSUADING THEM TO OFFER PRIZES OF $100 (TO THE AGRICULTURAL SOCIETY) AND $25 (TO THE INDIVIDUAL) PLANTING THE MOST TREES ON APRIL 10, 1872
ON THE FIRST ARBOR DAY NEBRASKANS PLANTED OVER 1,000,000 TREES!
TODAY AMERICANS ARE PLANTING TREES AT THE RATE OF 38 MILLION PER YEAR! TOP YEAR FOR AMERICAN PLANTING WAS 1941 WHEN 98,000,000 SEEDLINGS WERE SET OUT

GREEN-up AMERICA

Plant Trees

Control Tough Weeds and Brush!



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A powerful 2,4-D weed killer especially effective against woody brush and sprouts—also many difficult-to-kill herbaceous weeds, 1-gal., 5-gal., 30-gal., and 50-gal. sizes.

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A new, powerful weed killer especially valuable against woody species sometimes resistant to 2,4-D formulations. These include osage orange, ash, certain oaks, brambles and poison ivy. Used separately or in conjunction with Esteron 44, it assures satisfactory control. 1-gal., 5-gal., and 50-gal. sizes.

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"Chemical mower" for weeds along streams, ditch banks, fences and roads. Kills most annuals. Destroys weeds and grass above ground, leaves roots of perennial grasses to prevent soil erosion. 10-gal. and 50-gal. drums.

Dow Weed Killers mean business! When stubborn weeds and brush fight back, let your maintenance crews give them a thorough dose of the *right* Dow Weed Killer. Spray them to death with Esteron 44 and Esteron 245, the weed killers that knock out woody type plants. Or use 2-4 Dow Weed Killer, Formula 40—or Dow Contact Weed Killer—depending on the job you have to do.

Halfway measures won't work with weeds! Go at them with the *right* Dow Weed Killer—get positive results—save time and trouble.

It will pay you to get all the facts! See your dealer—or write to Dow for literature.

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The Arborists Clinic

Operator Spraying Experiences for 1948

The following letters from arborists thruout the country give some interesting experiences in the use of various materials on a number of insects and diseases, as well as fly and mosquito programs. You will find much of value in these letters.

JOHN STASHENKO,
Elmcroft Tree Service, Stamford, Conn.

Dear Ed:

Being a hard headed and conservative Connecticut Yankee, I was cautious in using the newer insecticides. And before I used them, I tried them on plants and trees on my own place for one and two years, before applying them to general field use. For the control of tent-caterpillar, canker worm, tussock moth, elm leaf beetle and Jap beetle I used 2 pounds of Pratt's 50% Wettable DDT powder with 2 pounds of Chipman arsenate of lead and one pound of Orchard Brand film-fast sticker to 100 gallons of water applied by a hydraulic sprayer. This combination effectively controlled the above mentioned insects. I did not notice any mite damage on elm trees from the use of DDT. I noticed when I first started using DDT that there were very few coccinellid (lady bugs). But it seemed obvious that they are becoming resistant to DDT because I find many more of them around on the places that I spray.

For mosquito control using a hydraulic machine I use one quart of 50% DDT and three pints of Pratt's DX A pyrethum and rotenone spray to 100 gallons of water. This is applied as a fine mist to all small trees, grass and ground shrubs around buildings. 100 gallons of spray will cover from 1¼ to two acres of land. It will keep mosquitoes and flies away for three weeks with one thorough spraying. In the mosquito control test made in 1945 11 acres of swamp and woodland was laid out in one-acre blocks. One block was sprayed, one was left unsprayed and so on throughout the 11 acres. A person could walk into a sprayed acre and not receive any mosquito bites, yet after entering an unsprayed block mosquitoes would be plentiful. The reason for this test was to prove that control could be maintained by spraying the grounds of one acre or more of one home, while the surrounding homes remained unsprayed.

Another problem we have here in Connecticut is an abundance of scab on fruit. Of the newer insecticides I have used Puratized and Phygon X.-L., the latter made by ıe United States Rubber Co. We had the best control with Phygon X.-L., using ¾ pounds to 100 gallons of water applied with a hydraulic machine. This was applied to the fruit trees four times during the growing season. On my own place where five sprays were applied I had 100% control on McIntosh.

For the control of birch leaf miner I used 3 pounds of Toxaphene 40% (chlorinated camphene) to 100 gallons of water. I applied two sprays during the growing seasons with excellent control.

I am testing several other newer insecticides, but I still believe that we will never replace the old standbys such as lime-sulphur, Bordeaux arsenate of lead, nicotine sulphate and Pyrethrum and rotenone sprays.

BILL LANPHEAR,
Forest City Tree Protection Co.,
South Euclid, Ohio

I hope you receive this in time to make some use of it. We have used various spray materials in both hydraulic and mist blowers, but I suppose like other arborists, are still waiting for a better solution.

In the mist blower we used Vapona considerably and had good results on canker worms and mosquitoes and not so good on Japanese beetles. I believe the DDT formula recommended for Dutch elm prevention would give much better control over the Japanese beetle. We did use the following

(Continued on page 19)

Confirmed DED case in the Cleveland, Ohio, area. Note symptoms of defoliation and flaccid foliage in upper right hand corner. Picture taken in July 1947.

Photos Courtesy Cleveland Div. of Shade Trees

Dutch elm disease works fast. The same tree in June 1948, eleven months later. The tree was completely dead in August.

Concentrated Spray Mixtures for Mist Blowers

By Edward H. Scanlon

(From Data Supplied by S. F. Potts, U.S.D.A.)

DDT mixtures are prepared as solutions, emulsions, and suspensions (tables 1 to 5). Use extreme care not to overdose trees or plants with pure oil solutions, even in the dormant stage. For foliage, the refined kerosene or thin, white mineral oil (high unsulfonatable residues) are less toxic to plants than heavy, unrefined oils. Oil solutions containing 4 to 12% DDT and emulsifiable solutions with 40% DDT content or less, are obtainable commercially, as are the wettable DDT powders. DDT-oil formulas should not be combined with sulfur or Dinitro compounds (as DN 111).

The safest and most widely applicable mixture is the Xylene-DDT-Triton-water emulsion (tables 4 and 5), although the oil solutions of tables 2 and 3 are somewhat more effective for mosquitoes. Wettable DDT powder suspensions are less effective than emulsions and solutions of DDT.

All arborists who conduct spraying operations should obtain the insect and plant pest control booklet "ENTOMA" from G. S. Langford, College Park, Md. (Price $1.25). It lists most of the insecticides, fungicides, and application equipment, and addresses of manufacturers, together with other information of great value.

Insecticides and Fungicides Other Than DDT

Oils: Miscible oils or oil emulsions, diluted with water to 25% actual oil content, may be used at the rate of three gallons per big shade tree or 10% of the spray volume applied by the hydraulic dilute-spray method. Use extreme care not to overdose.

Lead Arsenate: Used in concentrates together with fungicides, stickers, and spreaders. A satisfactory mixture consists of 2.5 pounds of lead arsenate, 7 pints of water and ½ pint of oil, added in that order while stirring. This makes a gallon of mixture. Apply enough mixture to equal 1 pound of lead arsenate per big tree or 10 to 15 pounds per acre of woodland.

Chlordane: The pure liquid compound is 100% oil soluble. A 50% wettable powder is also available and is prepared and used in the same manner as for 50% wettable DDT.

To make a chlordane emulsion for mist blowers, add 1 pint of liquid chlordane to 1 pint of kerosene to which has been added 1 ounce of Triton X-100. Then add 3 quarts of water or enough to make a gallon. To make a gallon of solution containing chlordane, add 1 pint of liquid chlordane to 7 pints of oil (as kerosene). Use twice as much actual chlordane per acre as for DDT.

Nicotine Sulfate: Use 8 fluid ounces of Black Leaf 40 per 7½ pints of water. The nicotine sulfate can also be added to DDT emulsions, oil emulsions, and miscible oils.

Pyrethrum: Marketed as a powder or extract and compatible with insecticides and fungicides. *Avoid mixing with lime.* The oil extracts must contain an oil soluble emulsifier before dilution with water, and like other oil solutions, should in general not be combined with sulfur. Extracts can be added directly to oil. Use 1 pound of powder or 1 pint of emulsifiable (1% pyrethrin content) extract per gallon of water.

Rotenone Compounds: One pound of Derris or Cube powder or 8 ounces of emulsifiable 5% rotenone extract can be added to enough water to make a gallon of finished spray. *Avoid lime in the mixture.*

Wettable Sulfur: A gallon of finished spray consists of mixing 3 pounds of wettable sulfur with 6.5 pints of water, and then adding ½ pint of mineral oil.

Lime-sulfur concentrate can be applied undiluted. The addition of 4 to 6 ounces of glycerine per gallon of lime-sulfur helps the deposit by preventing too rapid drying of the lime-sulfur droplets, particularly in hot, dry weather. Use 2 gallons per big tree. *Caution:* Lime-sulfur residues will color buildings.

Copper compounds: Basic copper sulfate and Coposil (copper silicate) formulations have been prepared as well as Bordeaux mixtures of various concentrations. Copper compounds of the types used may be combined with oils but unless applied as dormant treatments the oils should be highly refined or summer oils. A good formulation consists of mixing 7¼ pints of water, 1.5 pounds of basic copper sulfate (34 to 53% Cu), and 4 ounces of oil, in that order to make a gallon of finished spray. Arsenicals can be added to this mixture, if desired.

Puratized: Use ½ pint of puratized per 7½ pints of water. Do not mix with oil. Especially good for Sycamore anthracnose control when applied at the rate of 2 gallons of the mixture per big tree. As this chemical is poisonous, wash the hands and other exposed parts of the body after using and do not swallow any of the spray. Carry a covered can of clean water and rags on the sprayer.

Neotran: Mix 8 ounces of the 40% wettable powder with 7¼ ounces of water and add 2 ounces of mineral oil to make a gallon of finished spray. This mixture is for *red mite control.* It exhibits considerable residual toxicity and is not harmful to man and domestic animals. Can be used in place of Parathion or T.E.P. (tetra ethyl pyrophosphate).

TABLE 1.—FORMS OF DDT AND HOW THEY ARE USED

Forms of DDT	*How Used*
I. Technical (100%) DDT powder (Commercial)	Cannot be added directly to water without *first* being dissolved in a solvent to which an oil soluble emulsifier (like Triton X-100) is added after the DDT is dissolved. Can be dissolved in sufficient amounts of kerosene, No. 2 fuel oil, xylene, benzene and other DDT solvents.
II. Wettable DDT powders containing 25 to 50% DDT (Commercial)	Add directly to water to make a suspension for mist blowers or for hydraulic sprayers. Do not add oil.
III. Wettable DDT powders containing 10% DDT (Commercial)	Use as a dust. Do not use in sprays.
IV. Emulsifiable DDT containing 25 to 40% DDT (Commercial or home made)	For general use. Add to water or to oil to make any concentration desired for mist blowers or for hydraulic sprayers. Dilute to 4 to 12% DDT concentration for mist blowers. For hydraulic sprayers use one to two pints per 100 gallons of water. These are DDT solutions to which an emulsifier has been added.
V. DDT solutions containing 4 to 40% DDT (Commercial or home made)	Do not add directly to water. Do not use "as is" in hydraulic sprayers. Can be added directly to oil for use in mist blowers at 4 to 12% DDT concentration. Can be diluted with water for mist blowers or hydraulic sprayers (as for IV above) after adding 1 part by volume of emulsifier to each 20 parts of the solution before adding the water.

TABLE 2.—QUANTITIES OF MATERIALS TO USE IN MAKING GIVEN CONCENTRATIONS OF DDT FOR MIST BLOWERS.

% DDT	Ingredients	Quantities of material for one gallon	10 gallons	100 gallons
A	Water			
	Wettable powd.	1 gallon	10 gallons	100 gallons
6	(50% DDT)	1 pound	10 pounds	100 pounds
B	Kerosene	1 gallon	10 gallons	100 gallons
	100% technical	6.4 ounces	4 pounds	40 pounds
5	DDT powder	(0.4 lb.)		
B	No. 2 fuel oil	1 gallon	10 gallons	100 gallons
	100% technical	½ pound	5 pounds	50 pounds
6	DDT powder	(8 ozs.)		
	Xylene	2¼ pints	2 gallons and 3 quarts	28 gallons
C	100% technical			
12	DDT powder	1 pound	10 pounds	100 pounds
	Triton-X-100	2 fluid ounces	1¼ pints	12½ pints
	Water	5⅓ pints	6⅔ gallons	67 gallons
	Xylene	1 pint and 2 fluid ounces	11¼ pints	14 gallons
C	100% technical	½ pound		50 pounds
6	DDT powder	(8 ozs.)	5 pounds	
	Triton X-100	1 fluid ounce	10 ounces	6 pints
	Water	6½ pints	83 gallons	83 gallons

A—means suspension spray.
B—means solution spray.
C—means emulsion spray.

TABLE 3.—DILUTION TABLE FOR DDT SOLUTIONS AND EMULSIONS MADE FROM 25% EMULSIFIABLE DDT SOLUTION—FOR MIST BLOWERS.

% DDT	Ingredient	Quantities for 1 gallon	10 gallons	50 gallons	100 gallons
4	DDT solution	1¼ pints	11 pints 8 gals. and	6 gallons and 6 pints	13.5 gallons
	Water or Oil	6¾ pints	5 pints	43 gallons and 2 pints	86.5 gallons
5	DDT solution	1 pint plus 10 ozs.	2 gallons	10 gallons	20 gallons
	Water or Oil	6 pints plus 6 ozs.	8 gallons	40 gallons	80 gallons
6	DDT sol.	1 quart	2½ gallons	12.5 gallons	25 gallons
	Wat. or Oil	3 quarts	7½ gallons	37.5 gallons	75 gallons
10	DDT solution	3 pints plus 3 ozs.	4 gallons	20 gallons	40 gallons
	Water or Oil	4 pints plus 13 ozs.	6 gallons	30 gallons	60 gallons
12	DDT sol.	4 pints	5 gallons	25 gallons	50 gallons
	Wat. or Oil	4 pints	5 gallons	25 gallons	50 gallons

TABLE 4.—PREPARATION OF EMULSIFIABLE DDT STOCK FORMULA CONTAINING 0.37 POUND OF DDT PER PINT, OR 32% DDT BY WEIGHT.

Ingredient	Quantity for lots of one gallon	10 gallons	100 gallons
Xylene (xylol)	6¾ pints	8½ gallons	84.4 gallons
100% technical DDT powder	3 pounds	30 pounds 3 pints, 12 ozs.	300 pounds
Triton X-100	6 fluid ounces		4 gals., 5.5 pts.

TABLE 5.—PORTIONS OF THE ABOVE STOCK SOLUTION TO USE WITH WATER TO MAKE GIVEN CONCENRATIONS OF DDT (See "ENTOMA," pages 36 to 40).

% of DDT in finished spray	Quantity for lots of one gallon	10 gallons	50 gallons	100 gallons
12	2.7 pints solution 5.3 pints water	3 gals. and 3 pts. sol. 6 gals. plus 5 pts. water	16.87 gals. solution 33.13 gals. water	33.75 gals. solution 66.25 gals. water
10	2.25 pints solution 5.75 pints water	2.8 gallons solution 7.2 gallons water	14 gals. solution 36 gals. water	28 gals. solution 72 gals. water
6	1.35 pints solution 6.65 pints water	13.5 pints solution 8½ gals. water	8.5 gals. solution 41.5 gals. water	17 gals. solution 83 gals. water
5	1.125 pints solution 6.875 pints water	11.25 pints solution 8.6 gals. water	7 gals. solution 43 gals. water	14 gals. solution 86 gals. water
4	0.9 (14.4 ozs.) sol. 7 pts. and 1.6 ozs. wat.	9 pints solution 8⅞ gals. water	5.62 gals. solution 44.4 gals. water	11.25 gals. solution 88.75 gals. water

TABLE 6.—GALLONS OF 6% DDT SOLUTION OR EMULSION TO APPLY PER ACRE FOR: (MIST-BLOWER APPLICATION).

Insect species	Gals. per acre
Sawflies on pines	2
Green birch leaf aphid (1)	10
Brown-tail moth	2
May beetles	2
Lace bugs on oak and sycamore	2
Green-striped maple worm	3
Tussock moth	2
Fall webworm	1
Orange-striped oak worm	3
Forest tent caterpillar	2
Eastern tent caterpillar	2
Spiny elm caterpillar	2
Gypsy moth	2
Japanese beetles	3
Cankerworms	2
House flies (out of doors)	3
Horn flies (out of doors)	2
Black flies (out of doors)	2
Mosquitoes (out of doors)	2

(1) Nicotine, parathion, tetraethyl pyrophosphate and rotenone more effective than DDT, for this pest.

TABLE 7.—PINTS OF 12% DDT SOLUTION OR EMULSION TO APPLY PER TREE FOR (1) (MIST-BLOWER APPLICATION).

Insect	Tree height (feet) 80 to 120	65 to 80	50 to 65	35 to 50	20 to 35	10 to 20	Timing for Northeastern States
Brown-tail moth	..	..	..	1	1/2	1/4	Aug. 10 to 25th, and April 25 to May 20
May beetles	2	1.5	1	2/3	1/2	1/4	As soon as adults become abundant
Lace bugs on oak and sycamore	3	2	1	2/3	1/2	1/4	As soon as nymphs become abundant
Green-striped maple worm	1.5	1.5	1	1	1	1/2	July 15-31
Tussock moth	2	1.5	1	1	1/2	1/4	Start treatment when eggs start hatching
Fall webworm	1	1	1/2	1/4	1/8	1/16	Aug. 1 to 30
Orange-striped oak worm	1.5	1.5	1	1	1	1/2	Aug. 1 to Sept. 10
Japanese beetle	2	2	2	1	2/3	1/2	1st: July 1 to 15 2nd: Aug. 15 to 30
Forest tent caterpillar	1.5	1	2/3	1/2	1/4	1/8	April 20 to June 7
Eastern Tent caterpillar	2	1.5	1	1	1/2	1/3	April 5 to June 7
Spiny elm caterpillar	2	1.5	1	1/2	1/2	1/4	May 15 to June 15
Gypsy moth	1	1	1/2	1/4	1/2	1/8	April 20 to June 10
Cankerworms	2	1.5	1	1	1/3	1/6	April 25 to May 20
Elm leaf beetle	4	3	2	1	1/2	1/4	May 1 to June 15

[1] When using 6% DDT concentration, double the volume of liquid given in the above table.

GREEN-up AMERICA

Let's GREEN-up AMERICA This Spring

Arbor Day in America connotes a spirit of progress and culture that is unmatched in any country in the world. Since its inception in 1872, as a result of a great need and the farsightedness of the then Governor of Nebraska, John Sterling Morton, it has found a warm spot in the hearts of all Americans.

Unfortunately its observance and practice has been subject to up and down periods. Part of the cause of this enthusiasm and lassitude can be attributed to the fact that prior to 1947 no two states celebrated the day, by plan, on the same day. In 1947, due to the efforts of the National Arbor Day Committee two states, South Dakota and Massachusetts changed their statutes and established the "last Friday in April as Arbor Day."

This year, thru the efforts of National Arbor Day committees in seventeen states, there are a total of fourteen states wherein acts are being presented to state legislatures to establish the "last Friday in April as Arbor Day." It is to be hoped that at least a majority of these obtain the governor's signature.

"Green-up America" is the slogan of this committee that has as its objective a national observance of Arbor Day on the "last Friday in April" in all of the 48 states. True it is not possible to indulge in the planting part of the ceremony in every state on that day, but that can be done another day, while suitable literature, talks and movies can be the features of the "last Friday in April" ceremony in the states not climatically situated.

Harry J. Banker
Chairman
New Jersey Committee for National Arbor Day.

It seems certain that sustained yearly programs can be planned once a uniform date has been set for Arbor Day which should result in greater accomplishments. Arbor Day is a nice, clean, constructive dogma to teach children and in these days of increasing delinquency Arbor Day should come in for full recognition by educational organizations, as well as civic and service clubs, as an important step in their ladder to the successful reduction of the youth problem.

The various state committees have worked enthusiastically, hard and long to bring before various organizations and their legislature a National Arbor Day act. The results should be known in time for publication in the next issue of TREES Magazine.

Michigan Chairman Carl Fenner has the following committee hard at work: George McIntyre, Assistant State Forester; Bernard Ward, Secy., Michigan Nurserymens Association; Lester Bell, Extension Forester, Michigan State College, and Edwin E. Smith.

Paul Sandahl, Chairman of the Iowa committee has the following helpers: Wm. H. Collins, Secy., Iowa Horticultural Society; Fred C. Mansfield, City Arborist, Des Moines; Clyde H. Heard, Secy., Iowa Nurserymen's Association, and Clarence G. Yarn, Legislative Committee Farm Bureau.

The Connecticut Committee headed by Joe Dietrich has lined up a fine group who are in there "pitching"—Stewart Willson, Arborist, Thompsonville; Paul Walgren Sr., Arborist, West Hartford; Robert A. Bartlett, Bartlett Tree Expert Co., Stamford; Edward A. Connell, Lawrence Aero-Mist Co., Stamford; Prof. Sherman D. Hollister, University of Connecticut, Storrs; Joseph M. Fen-

Carl Fenner
Chairman
Michigan Committee for National Arbor Day.

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nell, Arborist, Bridgeport; and Wellington Kennedy, Kennedy Nursery, Greenwich.

The New Jersey National Arbor Day committee headed by Harry Banker is composed of: George Osterman, Nurseryman; Benjamin De Falco Jr., Montclair Shade Tree Commission; Mrs. Garrett Smith, Director, N. J. Federation of Shade Tree Commissions; Leonard Anderson, President, Arborists Association of N. J.; Richard Walter, Pres., N. J. Federation of Shade Tree Commissions; Jack Longhurst, Sec'y, Northern N. J. Branch National Association of Gardeners; Mrs. Arthur J. Sullivan, President Garden Clubs of N. J.; J. C. Smith, Arborist; Gerald Grootendorst, N. J. Farm Bureau, and Edw. Terner, Attorney, Arborists Ass'n of N. J.

Jack J. Varnum, Nevada State Chairman has had invaluable assistance from Rex Naanes, U. S. Forest Service, and Dan Drummond, Assistant State Forester and Fire Warden, both of Carson City. The Nevada act was presented by Assemblyman A. L. Cross of Sparks.

Maryland is highly expectant of putting the National Arbor Day Act on its books according to Chairman Hollis Howe. The committee is composed of: J. Hammond Brandt, Brandts Nursery, Upper Falls; H. Stevenson Clopper, Arborist, Baltimore; David M. Cordray Jr., Arborist, Baltimore; Adolph E. Gude, A. Gude & Sons, Washington, D. C.; John D. Loiseaux, Arborist, Towson, and C. Willard Stoner, Westminster Nurseries, Westminster.

The Ohio committee under Edward H. Scanlon, chairman, lists Arnold M. Davis, Director, Garden Center of Greater Cleveland; Mrs. Robert T. Mehl, President, Garden Club of Ohio, Inc.; John Byrne, Vice President, Ohio Forestry Association; Dr. L. C. Chadwick, Professor of Horticulture, Ohio State University, Executive Secretary National Shade Tree Conference; Jos. Sweeney, City Forester, Toledo; Harry A. Gray, Supt. of Parks, Cincinnati; John Siebenthaler, Secretary, Ohio Nurserymens Association, Dayton; Dr. Paul E. Tilford, Secretary, National Arborist Association; Ray Dietz, Supt. of Parks, Columbus; Richard Barnhardt, Supt. of Parks, Arkon; Charles F. Irish, Arborist, Cleveland.

(Continued on page 30)

Hollis J. Howe
Chairman
Maryland Committee for National Arbor Day.

Report of Annual Meeting The Michigan Forestry and Park Association

The Michigan Forestry and Park Association held its annual meeting on Thursday, February 3, 1949 at the Hotel Olds in Lansing, Michigan. We had a very successful meeting with about 175-200 in attendance. The meeting was featured with talks by Noel Wysong, Carl Fenner and Professor Forrest Strong. The following officers were elected for the year:

President: Glenn Marvin, District Forester for the Michigan State Highway Department, Grand Rapids, Michigan.

Vice-President: Keith Hoaflin, Forester, Mich. Bell Tel. Co., Dexter, Mich.

Secretary: Carl Fenner, City Forester, Lansing, Michigan.

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- SUMMER SPRA-CREAM—A creamy white, 83% stabilized emulsion of oils, especially selected for high insect control and safety. Used both as a Spring spray on evergreens and ornamentals—also as a Summer foliage spray.
- D-X SPRAY—A widely used spray for the control of sucking and chewing insects. Contains 1% rotonone, .37% pyrethrins and 5% DDT.
- D-X—A non-poisonous spray containing rotenone, piperonyl cyclonene and pyrethrum for sucking and chewing insects and where red mite and spider mites are a problem.
- PRATT'S 50% DDT—A dry wettable DDT that is micronized* to extreme fineness. *Trade Mark Reg. Micronized Processing Co., Moorestsown, N. J.
- PRATT'S 25% DDT—A soluble DDT in a glycerine vegetable oil base of great safety to foliage.
- PRATT'S Emulsifiable 25% DDT—An emulsifiable DDT in an aromatic petroleum derivative base with emulsifier.
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RYE, NEW YORK

16th Western Shade Tree Conference Sacramento, California May 25, 26, 27, 28, 1949

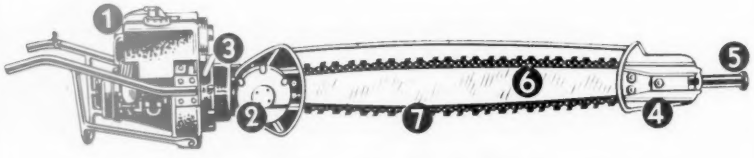
PROGRAM

Wednesday, May 25—
9:00 a. m. to 12:00 noon
Registration, El Rancho Hotel
12:00 noon to 1:45 p. m.
Luncheon, El Rancho
Reception, President Horace N. Bosworth
Address of Welcome: Her Honor, Belle Cooledge, Mayor, City of Sacramento
Guest of Honor and Speaker, Mr. Thomas H. Dennis, Principal Engineer, Div. of Highways, State of California
2:00 p. m. Appointment of Committees: Pres. Bosworth
Program: AN EXPLANATION OF PLANT BREEDING
Chairman, Prof. Woodbridge Metcalf, Extension Forester, Univ. of California and the U.S.D.A.
Speaker, Dr. Gilbert W. Scott, Geneticist, Associated Seed Growers, Inc.
Speaker, Mr. John W. Duffield, Geneticist, U.S.D.A. Forest Genetic Station, Placerville
A discussion period will follow.
5:00 p. m.
Meeting of the standing Arboreta Committee
7:00 p. m.
Dinner, El Rancho
Sponsored by the Committee on Arboreta
Speaker, Mr. Aaron L. Olmstead, Landscape Architect, Division of Highways, State of California

Thursday, May 26—
9:00 a. m. to 12:00 noon
Program, PLANT PESTS AND DISEASES AND THEIR CONTROL
Chairman, Professor Pierre A. Miller, Div. of Plant Pathology, Univ. of Calif. at Los Angeles
Speaker, Mr. Laurel Smith, Entomologist, Shell Oil Co.
Speaker, Mr. John B. Steinweden, Entomologist, Dept. of Agriculture, State of California
Speaker, Dr. D. G. Milbrath, Chief, Bureau of Plant Pathology. State Dept. of Agriculture
12:30 to 1:45 p. m.
Luncheon, El Rancho
Guest Spaker, Professor Howard E. McMinn, Dept. of Botany, Mills College, Oakland, Calif.
2:00 p. m. to 4:00 p. m.
Program, THE CHEMISTRY OF WEED KILLERS, ADAPTATION BY COMMERCIAL ARBORISTS
Chairman, Professor Pierre A. Miller
Speaker, Professor A. S. Crafts, Dept. of Botany, Univ. of California, Davis
Speaker, Mr. Roger F. Sohner, Commercial Arborist, San Anselmo, Calif.
4:00 p. m. to 5:00 p. m.
Program: PLANT SPECIMEN IDENTIFICATION AND MANAGEMENT
Speaker: Mr. Milton D. Miller, Extension Specialist in Agronomy, Univ. of California, and the U.S.D.A.
7:00 p.m.
Dinner, El Rancho
Sponsored by the California Arborists Association, Chairman of Entertainment, Dana Bowers
8:30 p. m.
Program, A DISCUSSION OF THE DAYS' SUBJECTS
Chairman, Professor Pierre A. Miller
Panel:
Mr. Laurel Smith
Mr. John Steinweden
Dr. D. G. Milbrath
Professor A. S. Crafts
Mr. Roger F. Sohner

Friday, May 27—
9 a. m. to 10:00 a. m.
Program, EDUCATION AND THE CONFERENCE
Speaker, Mr. Peter Riedel, Plantsman, Teacher, Park Dept., City of Santa Barbara
10 a. m. to 12:00 noon
Program, A DISCUSSION OF ARBORETA
Chairman, Mr. Ernest Higgins, Landscape Architect
Speaker, Mr. Brian O. Mulligan, Director Univ. of Washington Arboretum, Seattle, Wash.
Speaker, Mr. Maunsell Van Rensselaer, Director Santa Barbara Botanic Garden, Santa Barbara
12:30 p. m. to 1:45 p. m.
Luncheon, El Rancho
Guest Speaker, Mr. Donald P. Van Riper, Senior Landscape Architect, State Div. of Architecture
2:00 p. m. to 4:00 p. m.
At Capitol Park
Chairman, Mr. Ross O. McIntire, Principal Tree Surgeon, Park Dept., City of Los Angeles
Demonstration Speaker, Mr. Keith L. Davey
Demonstrations of Equipment by Commercial exhibitors and the Park Dept., City of Sacramento
Facilities of Capitol Park made available by Mr. Jerry J. Olrich, State Gardener
7:00 p. m.
The Banquet, Empire Room, Hotel Senator, featuring the Sacramento Convention Ensemble, Mr. Roy Claire, Director.

7 FEATURES of the NEW LOMBARD MODEL 7 MASTER SAW with the FAMOUS WARREN HIGH SPEED CHAIN



1. Additional power from the dependable Homelite motor. New lighter-weight saw, magnesium alloy construction.
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Dealer opportunity in some areas.

LOMBARD GOVERNOR CORP.
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ARBORISTS CLINIC

(Continued from page 13)

formulæ in our hydraulic sprayers:

DDT Tech. grade 16%	
Benzine Indust. grade	9 qts.
Velsicol Ar 50	4 qts.
Triton X-100	1 pt.

Water to make 100 gallons solution and got rid of the Japanese beetles. We also used these materials in the mist blower on elm trees in the following proportions:

48% DDT (Tech. grade)
12 gals. Benzine
¾ gal. Triton
30 gallons water

As far as we could see, no serious damage was done even though we sprayed on hot days in July. If we can draw any conclusions at all from our experience it would be that Vapona would be easy to use and satisfactory for leaf eaters, but for the insect carriers of the Dutch elm disease, we would rather use a water emulsion of Tech. grade DDT as recommended by the government in their formula A for hydraulic spraying and C for mist blowers. This year we would use a mite control in the second DDT spray because last year we were overrun with mites late in the season. We would be very careful about spraying sugar maples with any drift of Vapona, as burning is very easy. We had less damage with the water emulsions.

We hope this will answer some of your questions.

F. R. LANCASTER,
The Davey Tree Expert Co.,
Kent, Ohio

In response to your letter of February 9, I should like to point out that the only new spray material we have had much experience with is DDT. We have used the wettable powders as well as the trade-marked emulsions in hydraulic rigs, and we have used these trade-marked emulsions and DDT in commercial solvents in our mist blowers. In addition, we have used in our mist blowers our own version of Pott's formula.

The work on the applications of these materials extends from Boston to Indianapolis. Northward and southward, the band of use is almost as wide. While the picture has been generally good, I would say that our experience has shown that insect control and tree response as well do not fall in a constant pattern—there is no consistent picture over this extensive area, regardless of material used. In addition, there are indications that other inconsistencies might show up from year to year.

In field work such as this, it is virtually impossible to have adequate checks or controls. Certainly, it cannot begin to compare to the nature of the scientific test. It is a physical impossibility to keep adequate case histories. The most careful observations we have been able to make yielded no distinct pattern, so the value of any conclusions therefrom is very questionable. It would not be right for me to point out or discuss isolated cases of injury and attempt to tag a given material as responsible, nor would it be right either to brag or become unduly confident simply because a particular material goes through a season without causing many headaches.

Your idea of attempting to clear some of the operator experiences through "Trees Magazine" seems like a good one, and I apologize for not being able to be more definite concerning our observations. However, they simply are not old enough to have properly jelled. Honestly, Ed, there is a question in my mind whether any of the operators can be very positive, even after two or three years' experience.

WM. PENN MOTT, Jr.
Supt. of Parks, Oakland, Calif.

This department does all of its spray work with hydraulic equipment. As I mentioned to you when I saw you in Cleveland, our street tree spray program is considerably less than exists under your operations. We have one piece of equipment and a crew of three men. These men actually work less than one-third of their time on insect and pest control.

We use the following material in our spray program:

Benzene hexachloride, 10% gaunna isomer. 2 lbs. per 100 gal. water ("Gamtox Wettable—100") Stomach poison and contact. For aphids, thrips, soaking soil with solution for brachyrinus, wire worms, diabotica, etc.

DDD ("Rothane WP-50") 50% wettable 2 lbs. per 100 gals. water. Stomach poison—very effective on earwigs, oak moth, caterpillars.

DDT—50% wettable; 2 lbs. per 100 gal. water. Good all purpose, but more toxic to mammals than DDD.

Nicotine sulphate with petroleum oil emulsion (94.8%) ("Nicoma") 1½—2 gals. per 100 gals. water.

Lead Arsenate—3 lbs. per 100 gals. water, with small amount spreader (Tuton B-1956—Rohm & Haas). Stomach poison, but only in areas not dangerous to humans or horses.

Pyrethrum ("Bugfoil" 68.0% min. oil, soap 25% pyrethrins 1.0%). Contact spray—no residual effect. Mix ¼ gal—100 gallons water.

Bordeaux—5-5-50 fungus.

Copper carbonate—2% solution—fungus.

"Pestfoil" (Lithans plus DDT—scalecide for plants sensitive to miscible oils).

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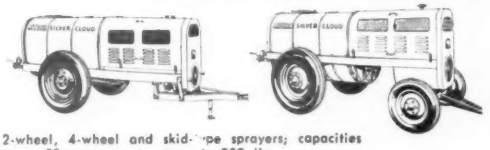

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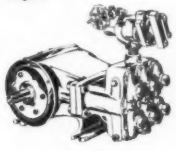

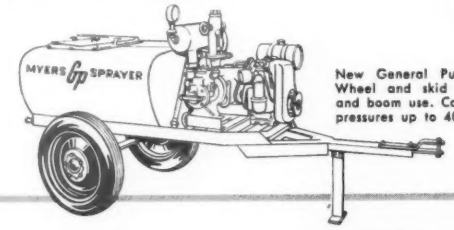

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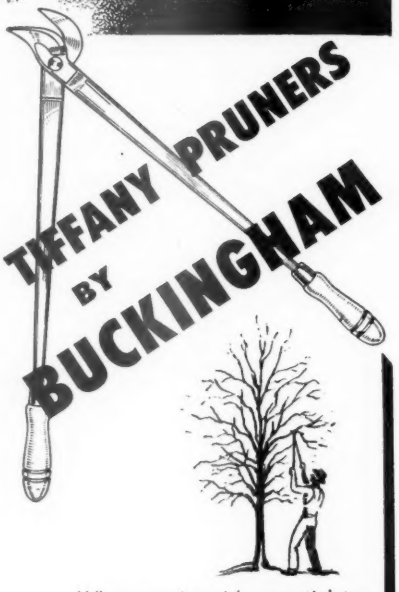

When pruning, it's essential to cut straight and clean so no moisture can collect under jagged edges and cause rotting. Tiffany Pruners help keep your trees healthy because they slice the limb —leave a perfectly flat wound— do not bruise or split the bark.

Cuts limbs and shoots up to 1½" thick. The curved hook and blade grip the branch close to the joint for better leverage and easier cutting. The levers, made of forged alloy steel, will not bend or break. Narrow jaws and slim points permit pruning in tight places. Easily sharpened—do not have to be taken apart.

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Recent Trends In the Field of Fungicides

By George A. Zentmyer
Associate Plant Pathologist
University of California
Riverside, Calif.

The past ten years have seen what amounts figuratively to a revolution in the pest control business. Fungicides, insecticides, weed killers—advancements in these fields have been tremendous and have kept pace with the similar amazing strides in the field of human medicine. The concern of this paper is fungicides, a field in which thousands of compounds have been tested in the past few years. The emphasis, as in the other fields, has been on organic chemicals, in contrast to the inorganic materials such as the copper and sulfur fungicides that were the main materials in use prior to 1940.

Ten years ago the pathologist had only two general types of fungicides available for spraying plants to prevent or control disease—the copper fungicides such as Bordeaux mixture and the various fixed coppers, and the sulfur fungicides including lime sulfur and various forms of elemental sulfur. Now the picture is vastly changed. The types of organic compounds that can be tested as fungicides are practically limitless; from those already tested a number of good fungicides have been discovered. There are several chemical groupings that have shown fungicidal value:

1. The dithiocarbamates or organic sulfur fungicides. In this group are such preparations as Fermate, Zerlate, Dithan D14, Dithane Z78, Parzate, and Goodrite Zac.

2. The quinones, including Phygon and Spergon.

3. The quaternary ammonium compounds, or heterocyclic nitrogen materials. In this group are several Puratized preparations, such as Puratized Agricultural Spray, Puratized Apple Spray, Puratized 111-5; and Isothan Q-15.

4. An ever-increasing miscellaneous group representing varied chemical structures. Included here are:

A. Derivatives of 8-hydroxyquinoline: Bioquin 1, Bioquin 100, and 8-hydroxyquinoline benzoate.

B. The glyoxalidines: Crag Fruit Fungicides (341B and 341C).

C. A new material that has shown both fungicidal and insecticidal value. Arathane (2, 4-dinitro-6-caprylphenyl crotonate).

D. The inorganic chromate group, including Crag Potato Fungicide.

E. An analog of DDT, known at present as Fungicide RE-358, or RE-395-M.

All of the above-mentioned materials are good fungicides for certain purposes. Some are more effective against one type of disease, some against another. They are the end products of screening many thousands of chemicals, and of much experimentation with formulation. All of the above materials are now available commercially except Arathane, RE-358, and Goodrite Zac, which are available only in experimental quantities.

Until recently there have been few trials of these new fungicides as foliage sprays to control diseases of shade trees. Some data are now available on the performance of some of these materials against shade tree diseases, and considerably more should be forthcoming in the next few years. Following is a brief summary of the effectiveness of these organic fungicides against various diseases, including information on their composition and rate of application.

Fermate (ferric dimethyl dithiocarbamate)—an organic iron fungicide that has been in use for a number of years. The black color is objectionable for some ornamentals, but it has given good control of such diseases as apple scab, apple rust, brown rot of stone fruits, anthracnose diseases of vegetables, downy mildew of cucurbits, black rot of grapes. As to shade tree diseases it has been reported as giving good control of anthracnose *(Gloesporium fructigenum)* on sassafras, and fair control of anthracnose *(Gnomonia veneta)* on sycamore. Fermate is used at the rate of 1½ to 2 lbs. per 100 gallons for hydraulic sprayers. Dimond and Potts (3)[1] used 3¾ lbs. plus one pint of oil (4 oz. SAE No. 10 mineral, 12 oz. linseed) in enough water to make 6 gallons of suspension for mist blower applications. Manufacturer: duPont, Wilmington, Delaware. (Another form, Karbam Black, is made by Sherwin-Williams).

Zerlate (zinc dimethyl dithiocarbamate)—similar to Fermate with the exception that the iron is replaced by zinc. It is a white powder, not generally as effective as Fermate, but has been reported to give good control of hickory leaf spot *(Gnomonia ovata)* and horsechestnut leaf blotch *(Guignardia aesculi)*. On other types of crops it gives good control of early blight of potato and tomato, various rust, cucurbit downy mildew, and anthracnose diseases. Used at the rate of 2 lbs. per 100 gallons for hydraulic sprayers. Manufacturer: duPont. (Another form, Karbam White, is made by Sherwin-Williams).

[1] Refers to Literature Cited.

Dithane D14 (disodium ethylene bisdithiocarbamate) — manufactured in liquid form and usually used in combination with zinc sulfate and lime (½ gallon Dithane, 1 lb. $ZnSO_4$, ½ lb. hydrated lime per 100 gallons of water). It has shown some promise against sycamore anthracnose in California (4, 9), but Carter (1) has reported poor results on black walnut leaf spot *(Marssonina juglandis)*. Dithane has given good control of early and late blights of potato and tomato, celery blights, azalea blight, tomato anthracnose. Manufacturer: Rohm & Haas Co., Philadelphia.

Dithane Z-78 and *Parzate* (zinc ethylene bisdithiocarbamate)—similar in action to Dithane D14, but a powder form used at concentrations of 1½ to 2 lbs. per 100 gallons of water for hydraulic sprayers. Also used in dust formulations. Manufacturer: Rohm & Haas (Z-78), DuPont (Parzate).

Goodrite Zac (zinc dimethyl dithiocarbamate - cyclohexylamine complex)—a white powder that has considerable fungicidal value but has not been widely tested. Manufacturer: B. F. Goodrich Chem. Co., Cleveland.

Phygon (dichloronapthoquinone) — has had few trials on shade tree diseases, but has given good control of sycamore anthracnose in some tests in California. It has controlled various fruit and vegetable diseases effectively, including apple scab, black spot of roses, cherry leaf spot, azalea petal blight, but in the past has caused some injury. It is an excellent seed treatment. A new formulation, Phygon-XL, of finer particle size, appeared in 1948; this form in combination with $MgSO_4$ (epsom salts) is said to be less injurious. Used at the rate of ½ to 1 lb. per 100 gallons of water for hydraulic sprayer. Manufacturer: U. S. Rubber Co., Naugatuck, Conn.

Spergon (tetrachlorobenzoquinone)—used more as a seed treatment, to prevent damping off and root rot, than as a foliage spray. It controls some of the downy mildew diseases of vegetables. Manufacturer: U. S. Rubber Co.

Puratized preparations—these include Puratized Agricultural Spray (phenyl mercury triethanol ammonium lactate), Puratized Apple Spray (phenyl mercury monoethanol ammonium acetate), and Puratized 111-5 (a mercury-copper quaternary ammonium complex). These materials are liquids, miscible with water, containing from 5 to 7 per cent mercury, and are used at dilutions ranging from 1-5000 to 1-20,000. Carter (1) has reported Puratized Agricultural Spray (1-5000) to be the best of a number of materials tested for control of sycamore anthracnose in Illinois over a

(Continued on page 22)

FUNGICIDES

(Continued from page 20)

period of several years. Carter also reports good control of black walnut leafspot with this material. Dimond and Potts (3) report good control of this disease with two mist blower applications of Puratized Agricultural Spray. The Agricultural Spray has given moderate control of sycamore anthracnose in California (4). This material and the Apple Spray have been effective in controlling other types of diseases including apple scab, apple blotch, bitter rot of apples, and various turf diseases. It is inadvisable to use these materials on mature food crops because of the mercury content of the fungicides.

In shade tree work the Agricultural Spray has been used at dilutions of 1-5000 and 1-10,000 for hydraulic spraying. Dimond and Potts used the following formula in mist blower applications: Puratized Agricultural Spray 1½ pints, glycerine 1½ pints, and 5⅝ gallons of water to make 6 gallons of spray. One and one-half to two gallons of the concentrate were applied to each tree (trees 50 ft. in height). Mist-blower applications of Puratized 111-5 have given good control of late blight of potatoes (7). Manufacturer: Gallowhur Chemical Corp., New York.

Bioquin 1 (copper 8-quinolinate)—a green, organic copper fungicide that has high fungicidal value, and has given promising results on diseases of several crops including apple scab, several potato and tomato diseases. In California it has given moderate control of sycamore anthracnose, and good control of a fruit rot of avocados. Generally used at ½ to 1 lb. per 100 gallons for hydraulic spraying. Bioquin 1 is also an excellent mildew-proofing agent for cloth. The present high price is one of its disadvantages for agricultural use. Manufacturer: Monsanto Chemical Co., St. Louis.

Bioquin 100 (zinc 8-quinolinate)—an organic zinc material that has not been tested extensively as yet. Manufacturer: Monsanto Chemical Co.

8-hydroxyquinoline benzoate — the chemical that has shown the most promise in chemotherapy trials for control and prevention of Dutch Elm disease, as reported by Zentmyer, et al. (10), and Dimond, et al. (2). The material has been injected into trees and applied to the soil, in a large number of trials. Details of the recent soil application work have been reported by Dimond in the Proceedings of the 23rd and 24th National Shade Tree Conferences. Manufacturers include: Mallinckrodt Chemical Works (Quenate), St. Louis; Monsanto Chemical Co.; Merck & Co., New York.

Crag Fruit Fungicides (mixture of glyoxalidines) — these materials have shown promise in controlling several diseases of apples, pears, and cherries; no tests have been reported on control of shade tree diseases. Manufacturer: Carbide and Carbon Chemicals Corp., New York.

Arathane (2, 4-dinitro-6-caprylphenyl crotonate)—this new material is particularly interesting because it has both fungicidal and insecticidal properties. It has not been tested extensively yet but shows promise on various diseases including apple scab and mildew, rose mildew, late blight of potatoes, brown rot of peaches, and brown rot of citrus fruits. Manufacturer: Rohm & Haas Co., Philadelphia. (Not yet available commercially).

Crag Potato Fungicide (a copper-zinc-chromate, containing 30% copper, 20% zinc, and 10% chromium)—this is an inorganic material which has shown promise in controlling early and late blights of potatoes, and may be effective against other diseases. It is used at the rate of 1½ to 2 lbs. per 100 gallons of water for hydraulic spraying. Manufacturer: Carbide and Carbon Chemicals Corp., New York.

Fungicide RE-358 (dimetacresyl tri-

(Continued on page 26)

● Hardie Sprayers have the power, capacity and stamina to spray the tallest trees from the ground. Motor truck mounted Hardies are very popular for shade tree and park spraying. Many such Hardie fleets are protecting forest trees in cities of the world.

The multiple utility of a Hardie High Pressure Sprayer gives it tremendous investment and convenience value. It is readily and inexpensively converted to a dozen different spraying jobs. It can be used for both high and low pressure application.

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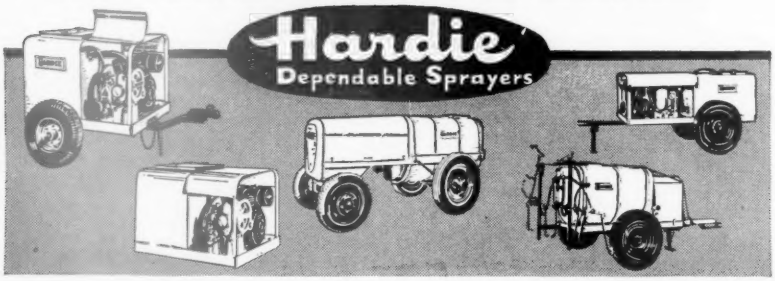

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Sturdy, efficient, built to last for years—the L-80 is backed up by years of exhaustive research, testing and engineering. It's the mist sprayer that revolutionized pest control.

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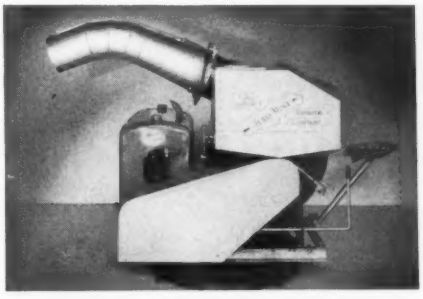

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SHELL AGRICULTURAL PRODUCTS

SHELL

R. R. WHITTEN

(Continued from page 6)

ing *it is essential to spray thoroughly all bark surfaces.*

First Treatment

Apply the spray *before* the elm flowers or leaves appear; complete bark coverage is *very* difficult after leaves or flowers are out. This period is usually during March in the South and during April in the North.

In hydraulic sprayers use formula A or B diluted with water to make 100 gallons.

In mist blowers use formula C diluted with water to make 20 gallons.

The average 50-foot elm tree will require from 25 to 30 gallons of spray with hydraulic equipment, or from 2 to 3 gallons with mist-blower equipment. These volumes may need to be increased for the second treatment when trees are in full foliage.

Second Treatment

Apply 2½ to 3 months after first treatment.

In hydraulic equipment use formula A or B diluted with water to make 200 gallons.

In mist blowers use formula C diluted with water to make 40 gallons.

A Control for the Carrier of Elm Phloem Necrosis

The leafhopper carrier of elm phloem necrosis infects healthy elm trees when it feeds on the leaves. To prevent this feeding *it is essential to spray thoroughly all leaf surfaces.*

First Treatment

Apply when elm leaves are full grown, usually during May in the South and during June in the North.

Use the same formulations and dilutions as given for second treatment to control the Dutch elm disease carrier.

Second Treatment

Apply when new elm foliar growth appears, usually from 1 to 2 months after the first treatment.

Use the same formulations and dilutions as recommended for the first treatment.

A Control for the Carriers of Both Elm Diseases

When the insect carriers of both the Dutch elm disease and phloem necrosis are to be controlled *it is essential to spray thoroughly all bark and leaf surfaces.*

First Treatment

Formulations, dilutions, and timing of spray as recommended for first treatment to control the Dutch elm disease carrier.

Second Treatment

Same time, formulations, and dilutions as recommended for the second treatment to control the Dutch elm disease carrier.

Third Treatment

Same time, formulations, and dilutions as recommended for the second treatment to control the phloem necrosis carrier.

Sanitary Control

In areas where the Dutch elm disease is present, it is good practice to destroy or treat all material in which elm bark beetles may be breeding, such as dead, dying, or recently cut elm wood. This can be done by burning or by thoroughly spraying all bark surfaces with a solution of DDT in No. 2 fuel oil (8 pounds of DDT in each 100 gallons of oil). This type of sanitary control will reduce the number of beetles in an area and also the chances of elm trees becoming infected. Since elm bark beetles can fly several miles, this type of control should be applied to large areas.

Spider Mites

Spider mites, or red spiders, will often build up to damaging numbers on elm trees that have been repeatedly sprayed with formulations containing DDT. These secondary pests can be controlled by adding Acme white oil to the emulsifiable DDT concentrates for use in hydraulic sprayers (formulas A and B). The oil should be added at the rate of ½ gallon for each 100 gallons of dilute emulsion and used in treatments made when elm trees are in foliage.

Equipment

Hydraulic sprayers capable of pumping 50 gallons per minute at nozzle pressures up to 500 pounds per square inch can be used satisfactorily to treat elm trees up to 80 feet in height. A mist blower having an output of 6,000 or more cubic feet of air per minute at a velocity of 120 miles per hour, and equipped to inject into this air stream from 1 to 4 gallons of concentrated DDT spray per minute at 40 pounds pressure, has been equally as satisfactory for treating elm trees up to 80 feet in height.

Sources of Spray Materials[1]

DDT, technical grade—most insecticide and chemical companies.

Benzene, industrial grade—dealers in coal-tar products.

Xylene, industrial grade—dealers in coal-tar products.

Velsicol AR-50—Velsicol Corporation, 120 East Pearson Street, Chicago, Ill.

Acme White Oil—Standard Oil Company of Indiana, 910 South Michigan Ave., Chicago, Ill.

Triton X-100—Rohm and Haas Company, Washington Square, Philadelphia, Pa.

[1] The inclusion of the names of manufacturers and their products does not imply endorsement, guarantee, or warranty of the materials so mentioned, or that other similar, untested products may not be used in the same manner with equal results.

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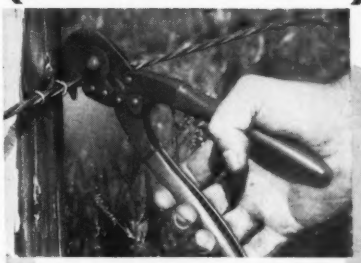

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Difficult, high tree pruning and line clearing is *easier* and *faster* when you use Porter Pole Pruners. They're lightweight and easy to handle, tough enough to give you years of day-in and day-out service. Blades cut cleanly and closely, promoting quick healing. A variety of poles up to 10 feet (solid) or 16 feet (jointed). Cutting capacity—1" green wood. Other pruners in one and two-hand models, — a pruner for every need.

Send for folders showing complete line of HandKliP tools and Porter Pruners.

H. K. PORTER, INC.
Somerville 43, Mass.

FUNGICIDES

(Continued from page 22)

chloroethane)—a promising new material that has not had extensive testing yet. It has shown possibilities for control of powdery mildews, pear scab, and citrus brown rot. Manufacturer: California Spray-Chemical Corp. (Not yet available commercially).

More details on use, limitations, and compatibility of some of the above materials may be found in an article by H. C. Young in the Proceedings of the 24th National Shade Tree Conferences (8). In addition to these new materials, new methods of approach to disease problems, and new methods of application are greatly increasing the scope of fungicide investigations. One of these new methods of approach is chemotherapy. Investigations during recent years have demonstrated the possibilities of controlling or preventing plant diseases by introducing some of these organic materials into plants either by direct injection or soil application. Work with the Dutch elm disease, as mentioned above, has shown considerable promise, and the field is an exceedingly fertile one for work on various types of disease.

Other new methods of approach to plant disease problems include work with antibiotic materials as fungicides, and increased emphasis on preventing certain insect-borne diseases by controlling the insects with insecticides. The Dutch elm disease is a good example of the use of the latter approach to disease prevention. The fungus that causes the disease is carried to healthy trees by a Scolytus bark beetle. DDT sprays to control this beetle are receiving considerable attention. A similar approach to prevention of phloem necrosis is indicated, inasmuch as this disease is also transmitted to healthy elms by an insect, in this case a leafhopper.

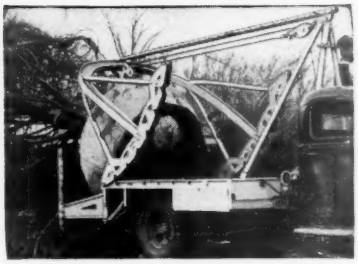
A new method of application of spray materials that is receiving considerable publicity involves use of the mist-blower of the type developed by S. F. Potts of the U. S. Department of Agriculture at New Haven, Conn (5, 6). The mist-blower uses air as the principal carrier to deliver fine droplets of a concentrated solution, as contrasted to the conventional hydraulic sprayer which uses large amounts of water to deliver a relatively dilute spray solution.

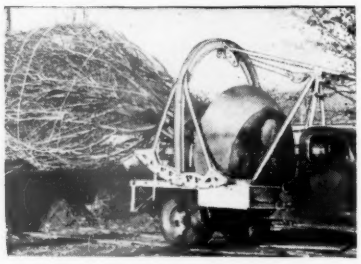
Good control of many insects by mist-blower application of spray concentrates has been reported. The principal advantages of the mist-blower method over hydraulic spraying are: use of very low gallonage per material per acre, lower cost of application, and the great reduction in time required to spray a given area or number of trees. As mentioned above little work has yet been reported

(Continued on page 30)

Trees...

New Rocker Mover Handles Big Trees Easily





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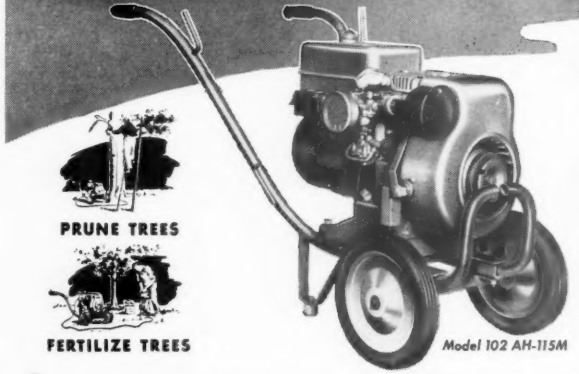

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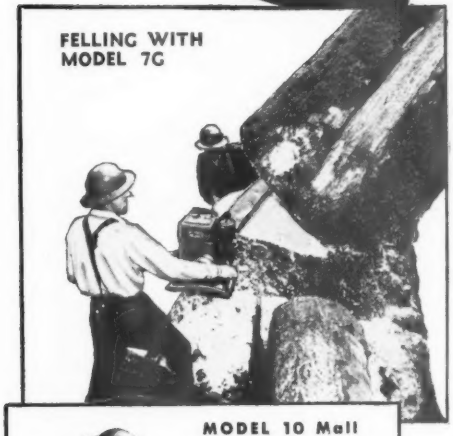

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If you want fast operation, with thorough coverage and fatigue-free, one-man control, then the Bean *Rotomist* is the answer. The new 1949 *Rotomist* has many new design refinements and features that more than ever make *Rotomist* the best way to apply concentrates, dry dust or wet dust. Its aerodynamic design releases micron-sized spray particles that give complete coverage with a minimum of drift. It also eliminates deposit of spray material on cars or homes.

The operator has full visibility for efficient, easy operation with responsive hydraulic controls. Write for free Rotomist Catalog.

Whether your needs call for a conventional high pressure sprayer or a Rotomist concentrate applicator, you'll save time, money, material and maintenance cost with John Bean equipment.

The John Bean line includes models with outputs to 60 gallons per minute at pressures to 800 lbs. And, for hard-to-reach areas, back yards, etc., there are portable John Bean sprayers and concentrate applicators. Write for free, complete information on John Bean specialized shade tree and pest control equipment.

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Figuring DDT Dilutions In Formulations

Six Percent Concentrated Emulsion DDT

TABLE ONE

DDT Dosage in 100 gallons	1 pint	1 quart	2 quarts	3 quarts	1 gallon	2 gallons	3 gallons	4 gallons	5 gallons
DDT in Diluted Spray									
Percent	.008	.016	.031	.047	.06	.12	.18	.25	.30
Weight	1 ounce	2 ounces	4 ounces	6 ounces	8 ounces	1 pound	1½ pounds	2 pounds	2½ pounds

Twenty-five Percent Wettable Powder DDT

TABLE TWO

Weight in 100 Gallons	1 pound	2 pounds	3 pounds	4 pounds	5 pounds	10 pounds
DDT in Diluted Spray						
Percent	.031	.062	.093	.125	.156	.312
Weight	4 ounces	8 ounces	12 ounces	1 pound	1¼ pounds	2½ pounds

By Malcolm A. McKenzie
Research Professor of Botany
Massachusetts Shade Tree Laboratories
University of Massachusetts

In the Short Course for Tree Wardens at the University of Massachusetts in the spring of 1948, the subject of DDT received rather complete discussion by competent entomologists. Subsequently, the writer, not an entomologist, but formerly Chairman of the general program, received many inquiries related to figuring DDT percentages in various formulations discussed.

Accordingly, tables were made correlating pertinent discussions on DDT given in the course. Long dilution tables and short tables were calculated. Field operators expressed most interest in the simplest table of basic figures with directions for making additional computations.

Recently, when Mr. Edward H. Scanlon, editor of Trees, talked with the writer about the possibility of preparing a discussion of the subject, the following tables for DDT emulsions and DDT wettable powders were prepared. The tables are based on notes made by the writer from various talks at the short course previously referred to and are furnished here without recommendations as to the efficacy of any particular dilutions in pest control.

Table One shows the per cent and weight of DDT in diluted spray for a 6% emulsion concentrate according to dosages listed in 100 gallons.

For similar dosages, in the case of 12%, 25% or 35% emulsion concentrates, the approximate percent or weight of DDT in diluted spray may be calculated by simply multiplying any percent or weight listed in tables by 2 for a 12% concentrate, by 4 for a 25% concentrate, by 6 for a 35% concentrate.

Thus for a 12% DDT emulsion concentrate, the DDT in diluted spray by weight is 2 pounds, if 2 gallons of DDT constitute the dosage in 100 gallons. (Explanation: By reference to the table 1 pound is weight listed for DDT in diluted spray under heading 2 gallons dosage in 100 gallons. Two times 1 pound equals 2 pounds or the weight of DDT in diluted spray if concentrate used is 12% strength.)

Similarly for a 25% DDT emulsion concentrate, the percent of DDT in diluted spray is 1% if 4 gallons of DDT constitute the dosage in 100 gallons. (Explanation: By reference to the table .25% is the percent listed for DDT in diluted spray under heading 4 gallons dosage in 100 gallons. Four times .25% equals 1% or the percent of DDT in diluted spray if concentrate used is 25% strength.) Accordingly, 8 gallons of 25% DDT concentrate in 100 gallons would give 2% DDT in diluted spray.

Table Two shows the per cent and weight of DDT in diluted spray for a 25% wettable powder DDT.

Percent or weight of DDT in diluted spray corresponding to certain amounts other than shown for "Weight in 100 gallons" may be determined readily by obtaining the sum of appropriate percentages or weights involved. Thus for 15 pounds of wettable powder in 100 gallons, the percent of DDT in diluted spray is .468 percent or the sum of the percentages shown for 5 pounds and 10 pounds of wettable powder in 100 gallons.

Similarly for 15 pounds of wettable powder in 100 gallons, the weight of DDT in diluted spray is 3¾ pounds or the sum of the weights in diluted spray shown for 5 pounds and 10 pounds of wettable powder in 100 gallons.

NOTE: DDT wettable powder is available commonly at strength of 25% and 50%. Per cent and weight of diluted spray in each instance shown in table would be doubled for 50% strength.

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Authors and Books

The following books may be ordered from TREES Magazine, Box 5607, Cleveland, Ohio.

THE NATIVE FORESTS OF CUYAHOGA COUNTY, OHIO by Arthur B. Williams, Cleveland Museum of Natural History, 2717 Euclid Avenue, Cleveland 15, Ohio. 90 pages. Illus. $1.00.

With this No. 1 Bulletin the Holden Arboretum publication board has made a splendid beginning. Dr. Williams, the author, knows the ecological, physical and historical story of this area as does no other man. He has tramped the hills and dales of Cuyahoga County for more years than he would care to remember, which added to his great store of scientific knowledge, has combined to make this publication a most accurate thesis of the forest greatness that once existed in the area. It is an historical piece of great value and should not be overlooked.

* * * *

BREAKING NEW GROUND, by Gifford Pinchot. Harcourt, Brace and Co., 383 Madison Ave., New York 17. 522 pgs., illus. $5.00.

This is the autobiography of a great public servant and the story of a great popular movement. Gifford Pinchot's career from 1889 to 1912 is the story of how practical forestry came to America, and how American forestry, in turn, gave birth to the movement for the Conservation of Natural Resources—a program that has been part of the creed of fighting progressive democracy for the past half century.

Breaking New Ground begins in 1889 when Gifford Pinchot, just out of Yale, decided that forestry was to be his profession and set off to Europe to get the scientific training that couldn't be found in this country. For ten years following his return he fought against the greed of private interests, bureaucratic corruption, and public indifference to show that sound forestry can produce lumber without destroying the forest. In large measure he was the creator of our system of national forests, the preserver of vast areas of our public domain. With Theodore Roosevelt as President, he became the country's foremost braintruster, at a time when all the progressive forces were centered in the Republican party. He formulated the Conservation program, wrote many of T. R.'s speeches defending it, and served on the important commissions that put it into practice. And when Taft succeeded Roosevelt, it was the dramatic Pinchot-Ballinger controversy that made a national issue of Conservation and helped to defeat Taft in 1912.

Completed before Mr. Pinchot's death in 1946, *Breaking New Ground* has the vigor and strenuousness of the life its author lived. It alternates accounts of political battles in Washington with stories of adventure exploring the nation's vast domain. It is lively with portraits of the men whom Pinchot knew. Most of all, it shines with the spirit of a man whose faith was "the public good comes first," and who spent a lifetime putting that creed into practice.

* * * *

TREES OF SANTA BARBARA (second edition) by Maunsell Van Rensselaer, Santa Barbara Botanic Garden, Santa Barbara, Calif. 213 pgs., illus.

Considerable new data on the hardiness, adaptability and locations of species omitted or sparingly described in the 1940 edition are included in this larger volume.

Santa Barbara is a veritable arboretum and serves admirably as the source from which to supply data such as is recorded on the 745 species and varieties reviewed in this book. Locations are given for more than 1000 noteworthy specimen trees so that interested persons may see the actual tree. 366 species and varieties are listed that were tried but are not now known to exist in the area. This is a fine check book covering a great majority of the exotics that have been introduced to California in the past seventy years.

ARBOR DAY

(Continued from Page 17)

Other state committees will be listed as they are received. The wording of this act to establish "the last Friday in April" as Arbor Day is simple. Two are reproduced here.

Connecticut

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. Beginning in 1949, the last Friday in April in each year shall be observed in Connecticut as Arbor Day. This day shall be designated annually by the governor with suitable proclamation urging that on Arbor Day schools, civic organizations, governmental departments and all citizens and groups give serious thought to, and mark by appropriate exercises of a public nature, the value of trees and forests; to the ornamentation of our streets, highways and parks with trees; to the economic benefits to be derived from well-cultivated orchards and forests.

STATEMENT OF PURPOSE: To designate the last Friday in April in each year as Arbor Day.

Nevada

(Matter in *italics* is new; matter in brackets [ ] old law to be omitted).

AN ACT to amend an act entitled "An act concerning public schools of the State of Nevada, establishing and defining certain crimes and providing punishment therefor, and repealing certain act and parts of acts relating thereto," approved March 15, 1947, as amended.

The People of the State of Nevada, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section 425 of the above-entitled act, being chapter 63 of the 1947 Statutes of Nevada, is hereby amended to read as follows:

Section 425. [Arbor day is hereby established in the State of Nevada, and shall be fixed each year by proclamation of the governor at least one (1) month before the fixing of such date.] *The last Friday in April of each year is hereby established as arbor day in the State of Nevada, and the governor shall proclaim the same at least (1) month prior thereto,* and it shall be observed with appropriate exercises by the public schools of this state.

SEC. 2. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

SEC. 3. This act shall be in full force and effect from and after its passage and approval.

FUNGICIDES

(Continued from page 26)

on mist-blower application of fungicides. The preliminary reports, however, indicate that the method also has definite possibilities in this field.

Literature Cited

1. Carter, J. C. Organic fungicides. Proceedings of 23rd National Shade Tree Conference: 122-127, 1947.
2. Dimond, A. E., J. G. Horsfall, and E. M. Stoddard. Progress in the Chemotherapy of Dutch Elm Disease. Proceedings of 23rd National Shade Tree Conference: 130-143, 1947.

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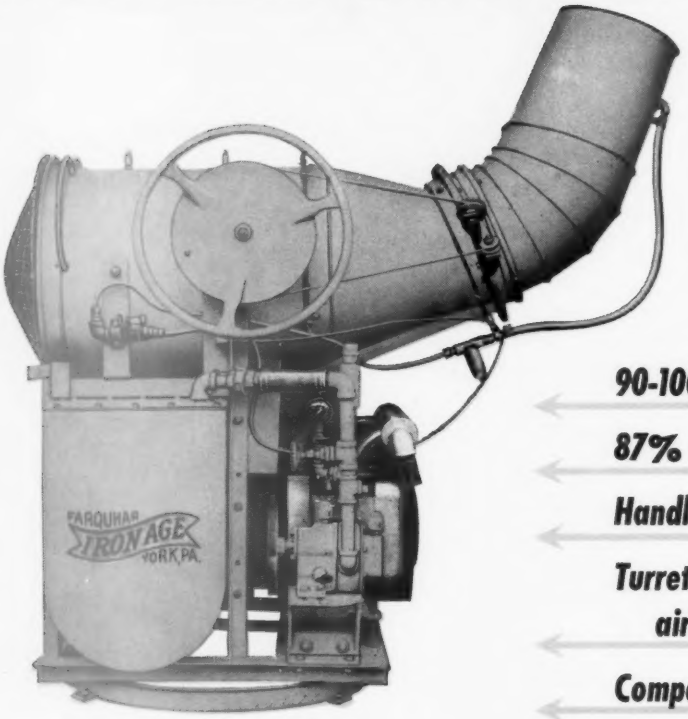

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